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THE NATAL AGRICULTURAL JOURNAL AND MINING RECORD

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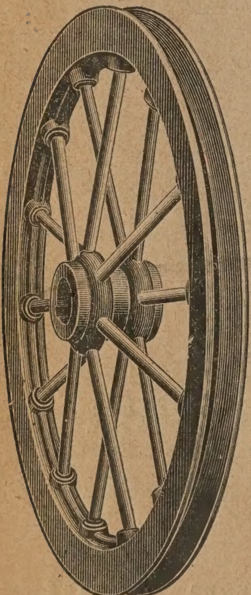

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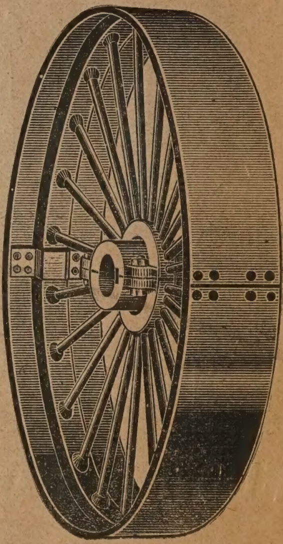

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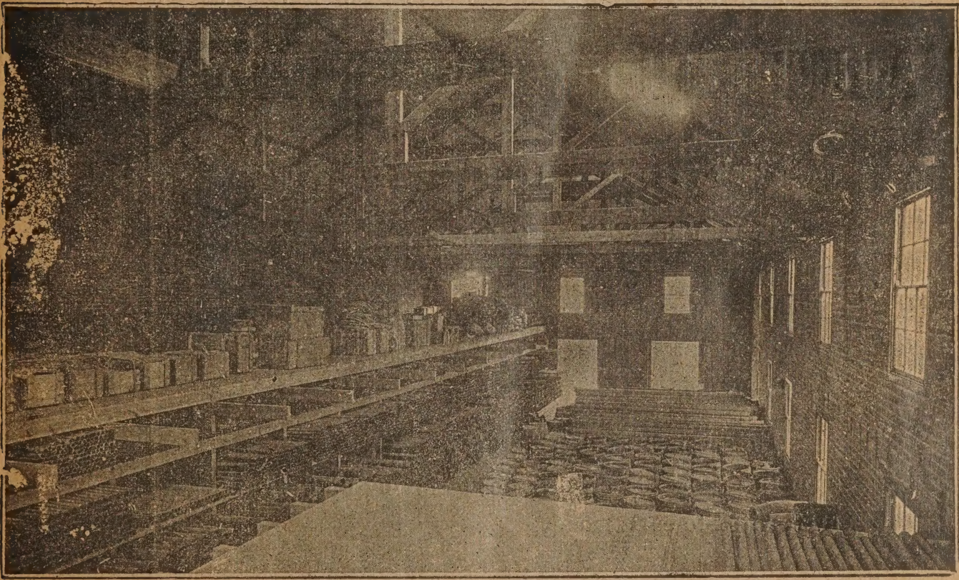

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NATAL AGRICULTURAL JOURNAL
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MINING RECORD.

EDITOR, H. RYLE SHAW.

Published for the Department of Agriculture

Publishers:
THE "TIMES" PRINTING AND PUBLISHING COMPANY, LIMITED.

1907.

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VOL. X. No. 1. JANUARY 25, 1907.

Natal Agricultural Journal and Mining Record.

Equine Malaria.

BY F. A. VERNEY, F.R.C.V.S.

EQUINE MALARIA is commonly known to stock-owners in South Africa as Biliary Fever. It is a type of disease known to pathologists as a piroplasmosis, and in this respect is closely allied to our ordinary Redwater, East Coast Fever, and Malignant Jaundice of the dog. Biliary Fever was first discovered in South Africa by Wiltshire in Natal and Hutcheon in the Cape (1883), and at this time the etiology of the disease was not understood. It is mainly due to the researches of Thieler that to-day we are acquainted with the pathology of this disease. Thieler found, on examining the blood taken from a case of Equine Malaria, certain animal parasites, which were enclosed in the red cells of the blood. These parasites varied very largely as to their frequency, and in some cases, unless one makes the examination at the onset of the disease, it is difficult to demonstrate the causal parasite in the circulating blood. On the other hand, in some acute cases, one may find as many as 10 per cent. of the red corpuscles infested with the parasite. The parasite is known as the piroplasma equi. It varies in shape. One meets pear, leaf, spherical and stave-like shaped parasites. By proper staining one can demonstrate a karyosome or nucleus which is always situated on the edge of a motile protoplasmic body. The parasite multiplies by fission or division, and as a result of this one sees corpuscles containing four parasites often disposed in a cruciform manner. This disposition illustrates one of the most characteristic features of the blood of equine Malaria, in contradistinction to the closely allied parasites of Redwater and canine Malignant Jaundice. Equine Malaria has a very wide distribution, and is practically found all over South Africa. In the Coast and Thorn belts the disease is very prevalent, and any susceptible equine going into these areas during the summer months soon becomes infected. The disease is also found on the high veld of Natal, but the amount of infection varies very much according to their own conditions.

Most of the Mooi River veld is infected with Equine Malaria, and imported horses turned out on the veld usually sooner or later develop the disease. On the other hand the veld in the Polela district is very largely free from infection. Basutoland apparently has very little Equine Malaria, as Basuto-bred horses coming into Natal invariably sooner or later develop Equine Malaria, and sometimes in a very acute form. Before the Boer war horses coming into Natal from the O.R.C. frequently developed Equine Malaria, and it was largely owing to the effect of this disease that it was a common expression amongst colonists that a Free State horse was no good for hard work until he had resided twelve months in Natal.

All imported equines are susceptible, and there is nothing that made it so difficult for the Remount Department to keep up the supply of suitable horses during the war as the attack of the parasite of Equine Malaria.

Imported horses were often accused of being soft and chicken-hearted when it was the presence of the piroplasma in the blood that was invariably responsible for their incapacity for arduous work. Horses bred on infected veld usually possess an active immunity or tolerance, but this is not always the case, and one occasionally finds old horses developing Equine Malaria that have lived on infected veld all their lives. In this respect it similates the behaviour of cattle to Redwater infection.

It is a very debatable point as to which imported horse is the most susceptible to the attack of Equine Malaria. Personally I am of the opinion the Argentine horse develops the disease in a more acute form than any other.

Symptoms.—The first symptom is a thermometric one, and if one takes the temperature of susceptible animals one would find a rise of temperature from 103 degs. F. to 107 degs. F. 24 or 48 hours before any other symptom is noticeable. This is an important point, and owners with valuable imported horses, running on the veld for stud purposes, should never delay taking the temperature if they have the least suspicion their horse is unwell. The animal becomes dull, appetite capricious, bowels become constipated, and the faeces develop into hard clay-like pellets, heavily coated with mucus, the pulse is very frequent, and may count from 80 to 100 per minute. The mucous membranes of the mouth and eyes are invariably in the horse of a distinct yellow colour, indicating considerable absorption of biliary products into the blood stream, and it is due to this constant symptom that the disease is called Biliary Fever. In the mule and donkey this bile staining is usually absent. The urine is high coloured, and in bad cases it becomes brown or red, similating the condition often seen in Bovine Redwater; the gait is frequently very unsteady, and in acute cases one has to be very careful in turning an animal, otherwise one may cause it to fall. As the disease progresses the animal becomes very depressed and debilitated, there is often swellings of the head, legs, chest, or sheath, indicating circulatory trouble, as the heart in this disease is always affected. Associated with this heart disturbance, one often observes difficult and laboured breathing, giving one the impression one has to deal with lung mischief.

The duration of the disease varies from five days to three weeks. Some animals, after showing evidence of recovery, get relapses. These are usually associated with heart trouble, and are always serious.

Imported mules and donkeys are very susceptible to Equine Malaria, and, instead of the jaundiced mucous membranes, these are of a very white or pale colour.

Post-mortem Changes.—On cutting into a dead horse one will at once notice the yellow colouring of all the tissues of the body. The spleen in acute cases is frequently (not always) very much enlarged, sometimes resembling an Anthrax spleen in size, but the consistency on section is not so diffluent; the heart shows ecchymoses or blood spots, both on the outside and inside; there may be an exudate into the covering of the heart (pericardium). In some cases the lungs may show evidence of congestion, but this is not usual. If the blood be noticed it is often watery in appearance. The piroplasma that is present in the cells of the blood has destroyed so many corpuscles that the quality of the blood has been so diminished that it can no longer carry out the functions nature requires of it. In a healthy horse the number of cells to a cubic millimetre is 7,000,000. In an acute attack of Equine Malaria this is often reduced in three days to 2,000,000. This fact is the direct or indirect cause of all the symptoms manifested in Equine Malaria. The liver is congested and deeply bile-stained, and the bile ducts often contain a thick brownish-yellow coloured fluid. The stomach and intestines are usually in a catarrhal condition, and blood spots may be present on the mucous membrane. The bladder is usually full, and contains brownish or dark-coloured urine. The kidneys are frequently enlarged and usually pale in colour, and the fat around them is often infiltrated with a serous fluid, and this is sometimes seen in the furrows of the heart.

The lymphatic glands of the viscera are often enlarged, juicy in section, and may contain blood spots or ecchymoses.

Treatment.—This consists of curative and preventative. If the curative tratment is taken in hand at this early stage of the disease then a large percentage of animals recover. In describing the symptoms I stated that the first evidence of the disease was indicated by means of the thermometer, and when Equine Malaria is expected, owners should always take the temperature of any susceptible animal that is at all suspected of being unwell. I am frequently called to cases of this disease, and on my arrival I find the animal has been ill for several days. The owner had considered the animal not in its usual form, but as it continued to feed he did not consider there could be very much seriously wrong. The appetite in the early stages of the disease is a very unreliable guide to the disease, as when a horse ceases to feed suffering from Equine Malaria, then one can rely upon it the case is very far advanced. Horses suffering from this disease often feed up to 24 hours of death.

At the onset of the disease, half a pound of Epsom salts with two ounces of spirits ether nitrous should be given, and this should be followed night and morning with doses of quininesulphate and spirits ether nitrous given in stout or kafir beer. The animal must be put under good conditions, loose box, plenty of fresh air. The body must be kept warm by means of rugs and bandages if the season of the year demands it. Hot enemas should be given night and morning, if condition of faeces indicate it. Gruel should be given instead of water, and the animal should be sparingly fed upon scalded bran, tops of good forage and green food. There are probably few acute equine diseases that respond better to good nursing than Equine Malaria. Complications, such as heart and lung trouble, must be anticipated in very bad cases, and these must be specially treated. Purgatives must always be avoided, as nothing kills quicker than a good sharp dose of physic. In treating the disease, it is essential to remember that it is not the liver that is the real trouble, but the anaemic condition of the blood, and if one can master this, then the condition of the liver will soon be rectified.

Animals after suffering from a bad attack are always much emaciated and very weak, and must be treated with good nourishing food, combined with suitable tonics.

Preventative Treatmens.—Although there is no positive experiment to tell us that ticks cause Equine Malaria, all the clinical experience at hand goes to show that this is highly probable. In addition, we have the knowledge that all the other South African piroplasmoses are certainly tick-carried diseases. Argentine Thoroughbreds imported into Natal for racing purposes rarely develop Equine Malaria, but as soon as you turn these animals out to grass in the summer then they will certainly develop the disease. Properly kept racehorses rarely, if ever, become tick-infected. Experiment has not shown which of our five common ticks is responsible for the disease, but if I had to give an opinion then I should say it is either the Red or Blue tick, as I have seen bad outbreaks of the disease occur where the Brown Bontleg and Bont ticks did not exist. Outbreaks of the disease have been considerably reduced by systematic dipping.

Animals that are to be turned out on to the veld should, if possible, come on to the grass in the very early spring months, as then the animal is most likely to get a milder infection and recover than when turned out in midsummer, when a gross infection will most probably take place.

Theiler, in endeavouring to prove if the piroplasma of the horse, mule and donkey were the same, found that if you inoculate a susceptible horse with the blood of a sick horse, or a horse that is healthy, but has suffered from the disease, one usually causes an acute form of the disease, which in many cases may prove fatal, but if one inoculates the blood of a recovered donkey into a susceptible horse then the disease usually takes a much more modified form, and the animal obtains an active immunity.

This knowledge may prove of great economic value in the future. In order to ascertain how this treatment would answer in practice, I had arranged through the Principal Veterinary Surgeon to test its efficacy on a number of Argentine horses, but the stress of work incurred by the presence of East Coast Fever in my district prevented me so doing.

Nearly every year in this district someone loses a valuable imported stallion from Equine Malaria, but if this inoculation method should prove reliable then all animals that are to be turned out on the veld could be immunised in the early spring, and so one could avoid frequent disappointment and financial loss to progressive horse-breeders.

The Principal Veterinary Surgeon adds, "Quite recently Dr. Theiler has shown that Biliary Fever in the horse, mule and donkey is communicated by the common little red tick found chiefly under the tail."

Short Notes.

VOLUME X.—With this issue is begun Volume X. It may be of interest to readers to hear that, despite the general depression, the demand for the *Journal* is constantly increasing.

E.C. FEVER IN RHODESIA.—The letter from the Chief Veterinary Surgeon of Rhodesia to the Principal Veterinary Surgeon of this Colony should be read by all. The principles adopted are clearly stated and illustrated by examples.

THE WEATHER.—One half of the Natal meteorological year having gone by, a reference to the Returns will prove of interest. Generally, the half year just finished shows a decided improvement in rainfall when compared with the corresponding period of last year. During the present month, up to the 21st, there have been only one or two days upon which rain has not fallen in the vicinity of Maritzburg.

South African Products Exhibition.—Mr. T. R. Sim, F.L.S., left for London on the 11th inst. as Representative of the Natal Government in connection with the above Exhibition. The collection of samples—forestry, fruit, agricultural, pastoral, mineral, etc.—is most satisfactory and representative. Among the "exhibits" are four large polished picture frames made from different colonial woods. In these frames are mounted about 150 illustrations from the *Journal.*

Bot-flies.—"Bot-fly" writes:--"A Short Note in the next *Journal* on 'Tansy' would be of interest now in view of the fact that its use as a destroyer of the bot larvae is a good deal discussed. What is Tansy, and how and where does it grow, and will it grow here, and who supplies the seed or roots or whatever it is, and how is the physic made and used, and its effect on the bot and on the horse, and so on? The available knowledge here is that somebody heard that Tansy-tea killed some bots, and that it may be bought at the chemists." Reference to the bot-killing powers of Tansy will be found in Vol. IV., page 661. Common Tansy is a bitter aromatic plant with small yellow flowers, common on old pastures in England. A few years ago Mr. Pitchford conducted experiments with Tansy on horses suffering from bots. Owing to the pressure of other work at the time the experiments could not be completed, but so far as they were carried the efficacy of the remedy was, says Mr. Pitchford, fully proved.

Geometrical Progression.—How quickly life—animal and vegetable—will increase under favourable conditions is known by all. Here is an example culled from Sydserff's "Treatise on Bees," published in England in 1792:—"Suppose a swarm of bees at the first to cost 10s. 6d. and neither the swarm to be taken but to do well and swarm once a year—bees must be naughty if they dare to do otherwise—what will be the product for fourteen years and what the profit, if each hive is sold at 10s. 6d.? One year, 1 hive, profit, nil; 2 years, 2 hives, profit, £1 1s.; 3 years, 4 hives, profit, £2 2s.; 4 years, 8 hives, profit, £4 4s.; 14 years, 8,888 hives, £4,503 16s. Deduct 10s. 6d., what the first hive cost, and the remainder will be clear profit." These figures with respect to the profits are of the class which fascinate townsmen when meditating on the attractions of farming. An interesting subject of life-increase in South Africa is afforded in the dowry gifts of a cow to girl children when born. This system of providing *dots* was at one time common among the Boers. If the girl's cows did reasonably well—quite apart from the substitution of heifer calves for the bull calves dropped—the progeny, by the time the successful swain came along, was a fine big herd, and, even in the days of big farming, must have made a very apparent gap into the paternal troop when taken away. Can any reader give an authentic instance of a successful marriage portion from one cow?

O.R.C. REGULATIONS.—Inconvenience has been experienced by farmers taking sheep and goats from Natal into the O.R.C. For moving this stock it is necessary to be provided with the certificates and declarations specified in the Proclamations of the O.R.C.; full information may be obtained from the Stock Inspectors of the Veterinary Department.

OLD COUNTRY LIFE IN ENGLAND.—A charming and appropriate book for the bookshelves in country houses is "An Old English Home," by the well-known author, S. Baring-Gould. It has now been published eight years, and should be procurable at a low price. The origin of proprietorship in land is first dealt with, and then there are chapters on manor houses, old furniture, the parish church, the village inn, the farmhouse, the village doctor, and so on, every subject being dealt with historically and enlivened with genial humour. In the chapter on "The Parish Church" is related one of the drollest stories imaginable.

"ANNUAL REPORTS."—In the October issue of last year we referred to the general absence of interesting matter in the Annual Reports of Agricultural Associations. *Inter alia* we wrote:—"Practically every man in the honourable position of President of an agricultural association knows from experience or observation of something from the vast subjects of stock management and agriculture which would be of value to many of his fellow Colonists and consequently to the Colony at large, and yet, unfortunately, only rarely is the splendid opportunity turned to the best account." Since then two Annual Reports have appeared—one by Mr. Thos. Stead and the other by Mr. John Marwick—which go to confirm the opinion that these reports may be charged with information and criticism of valuable and interesting character. It is to be hoped that in the future the majority of the Reports will be of the nature of those just referred to.

THE COST OF COOLIE LABOUR.—It is not all employers who know the cost of coolie labour. Mr. C. Gundelfinger, in a letter to the *Mercury,* works out the cost—presumably for Coast employers—as follows:—"The actual wage which has to be paid over to an Indian during his five years' indenture is 12s. 6d. per month on an average. His passage money, which has to be refunded to the Indian Immigration Trust, is £22 10s., or equal to 7s. 6d. per month. The rations he has to be supplied with average, according to the market price ruling, 9s. 6d. to 10s. 6d. per month. Then there are medical fees, hospital fees, and lodging. Furthermore, even if an Indian, after being brought here, is incapable through health, you still have to pay part of his passage money besides 1s. per day hospital fees, whilst he is here—a large expense indeed. The actual expense of indentured labour is not 15s. per month, or less, as my friend points out, but reaches the figures of anything from 32s. 6d. to 35s. 6d. per month."

Rosetta Co-operative Association.—A farmers' co-operative association has been formed at Rosetta. The directorate is composed of three well-known colonists—Mr. Cotton Acutt (chairman), Mr. Graham Hutchinson, and Mr. Bede Crompton. A speciality is to be made of table and seed potatoes. The Upper Mooi River district has for years held high reputation for its potatoes, and no doubt, with the guarantee of the Association, a big business should result. Mr. Edward E. Downing is the manager.

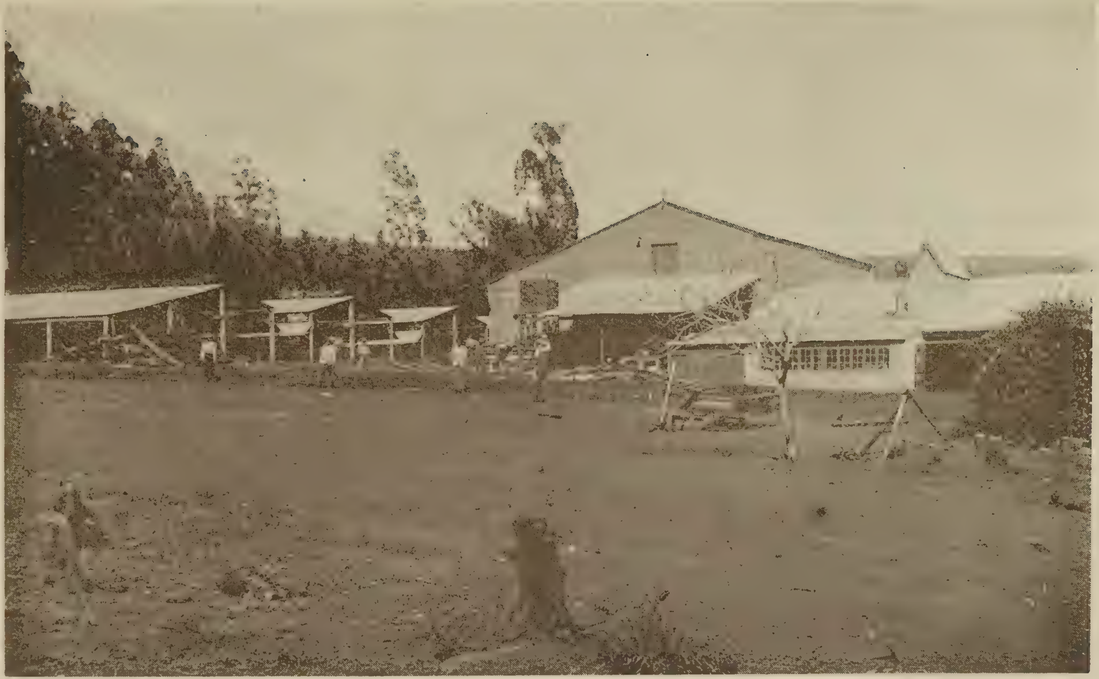
Locusts for Fowls.—A correspondent, writing to *The Farmers' Advocate,* says:—"My experience has been that, if obtainable, locusts are more valuable as a protein forming food for poultry than meat, green bone, bone meal, or any of the so much advertised foods. Marketable locusts should, of course, be properly dried, and in this state can easily be turned into meal by running through a bone-crushing machine or grain kibbler. In this form they should be fed with the morning wash, to adult birds one-third cf a ration three times a week. To young chickens and ducklings a more liberal supply, up to a daily feed, can be given with advantage. With laying hens I found the one-third ration improved the colour of the egg, ensured greater fertility,, and enhanced the condition of the whole flock. So convinced am I of this that so long as I can get the supply of locusts, I shall never be without them."

Hollow Building Blocks.—It is curious that in this country hollow concrete blocks are not more used for building. In the eyes of most people a stone building is preferable to a brick building even if the bricks are of the very best quality, and yet a building of hollow blocks, having at the distance of a few feet an appearance indistinguishable from freestone, can be erected as a smaller cost than one made of bricks. And the former building will have this advantage over both solid stone and brickwork—it will be damp proof. At Durban there is a Syndicate—Sir B. W. Greenacre, chairman—which makes the blocks for sale, or, what is better for building at a distance, will make them on the spot. This Syndicate gives the following as the special advantages and features of hollow block buildings:—"Indistinguishable from real stone. Practically indestructible, becoming harder the longer they are exposed to the weather. Being made in a machine geometrically true, blocks are all uniform in size and finish. Smooth inside and out, requiring no plastering, simply pointing inside to be ready for painting or papering. The blocks are manufactured of best Portland cement and sand, strongly compressed, with hollow centres, thus forming non-conducting air chambers, making damp and sound-proof walls, perfectly cool in the hottest weather. The blocks are laid dry, on a perfectly level foundation. Liquid cement grout is then poured into the small vertical holes or channels, leading to the channels formed in the upper and lower surfaces of the block, thus making a perfect bond. The ordinary or standard block for a 9in. wall is 18in. long, 10½in. high, and 9in. thick, being equal to twelve bricks when laid. The weight is about half that of brickwork. Owing to the great saving of labour, the cost of a wall built of these blocks is only about two-thirds that of brickwork plastered and tuck-pointed." In the course of a speech at a demonstration at the works of the Syndicate, Mr. Fletcher, the well-known Borough Engineer of Durban, said, according to a newspaper report, that the method of binding the blocks together in a wall made the wall watertight. Fourteen or fifteen years ago, when he built his house on the Berea, he was particularly careful—as careful as if he was doing it for the Corporation—(laughter)—to have a dry house. Despite the fact that he used the very best bricks, one side of the house was taking in water still. If he was building again he would use hollow blocks. Mr. J. H. Skinner is manager of the Syndicate, the offices being in the Imperial Buildings, Durban. Recently being attracted by a picture of a hollow-block barn in an American farmers' publication, we wrote for fuller information. In reply we received from the Prettyjohn Co., 600, North Sixth Street, Terre Hante, Ind., U.S.A., a beautifully got up and instructive pamphlet describing and illustrating their plant for hollow block-making. The pamphlet has pictures of imposing five storey buildings, churches, residences, barns, and little village stores.

DRY FARMING.—In the September issue of last year some observations were made in this column on an article which had appeared in the *Century Illustrated Monthly Magazine* on dry farming in the semi-arid districts of the United States. With the object of getting fuller information and of authentic character, we applied to the Agricultural Department of the U.S.A., and, in reply, a pamphlet on the subject has been courteously sent. To a considerable extent this pamphlet confirms the accounts of success obtained by the "dry" farmers. These are the facts which stand out most prominetnly. The soil is of first-class character, constant cultivation is necessary, and, as "insurance" of the dry-farm, some irrigation is indispensable, the stored water to be used for saving crops. The writer of the pamphlet, Mr. Elwood Mead, Chief of Irrigation and Drainage Investigations, says:--"It is believed that there are a few localities in the arid region where enough water cannot be had for the irrigation of 1 to 10 acres on each section. It is remarkable how much can be done with a little water where rightly used. The irrigation of 1 acre on a dry farm will make it possible to grow a wind-break of trees around the farmer's house and barns, which will serve as a shade in summer and one of the best of protections against winds and storms in winter. No range stockman needs argument to convince him of the value of these wind-breaks, and everyone who has seen the shimmering waves of heat which rise from these gray and dusty plains in summer appreciates the value of shade and foliage in midsummer. It will ensure a green lawn for the house, the growing of a wide range of fruits, and a still larger list of the best vegetables which can be produced anywhere. This will do one of two things for the farmer: It will save him from an excessive bill for canned goods or from living on a monotonous diet. If 5 acres of land are irrigated and 1 given to trees, orchards, and garden, 4 will be left for field crops. Planted to alfalfa this will produce 15 to 20 tons of hay—enough to support the farmer's milch cows and work horses. That much land will support a farmer in dry years if he grows on the rest of his farm." Irrigation thus appears to be necessary to save the farmer from the risk of absolute ruin. Mr. Mead elsewhere remarks:—"Nothing can be more dreary or discouraging than the aspect of the dry farmer's home in midsummer. Without shade trees, without green grass, without fruit, the dead, dusty, and lifeless appearance of the landscape is monotonous beyond measure. It makes one realise that 'a world without turf is, indeed, a desert.' The fact that many of these farmers are prosperous does not remove the need for trees, fruit, grass, and gardens, nor lessen the value of these features of a home as seen on irrigated farms in the same region. The dry farm needs enough irrigation to provide these things. It needs it for the comfort of the family. It needs it for the opportunities it will give to make a living in dry years, as well as larger profits in wet ones, and it is only by supplemental irrigation that the limits of settlement can be pushed westward across the driest part of the semiarid belt." The U.S.A. authorities are devoting much attention to the best methods for providing this partial irrigation—by pumping, by storing of storm waters, and by irrigating with flood water. The results obtained from 2 or 3 acres irrigated by water from wells pumped by wind mills and oil engines are astonishingly good. The lessons for South African "dry" farmers are not unfamiliar—do everything reasonable to have water for irrigation, cultivate constantly, and grow only the most drought-resistant varieties of the crops wanted.

Wattle-Bark at Ravensworth.

THE illustration facing this should have accompanied the "interview" by Ergates with the Hon. F. T. Angus, M.L.C., which appeared in the November issue of last year. The Ravensworth factory in a sense is the centre of the estate. Here are sheds for drying bark, here is the engine power for chopping the bark and stamping it into sacks, and here also, in the fitting and carpentry shops, is done the large amount of mechanical work incidental to a wattle-bark estate. All the factory work is under the supervision of Mr. F. B. Angus.



WATTLE-BARK.—FACTORY AT "RAVENSWORTH."

The Hon. F. T. Angus, M.L.C.

Experimental Stations—Programme, 1907.

The following is a programme of undertakings now in hand and projected for the current season, together with interim reports detailing progress during period ended 31st December, 1906. An effort has been made to organise a general scheme of experiment bearing relation to the more urgent of local agricultural problems. It is clearly recognised, however, that this is by no means exhaustive, based, as it is, upon observations made at a relatively small number of centres, and, in view of my recent arrival in Natal, sugegstions of difficulties experienced in any branch of agriculture will be welcomed and made the basis of further investigations.

E. R. SAWER,
Director, E.S.

CENTRAL EXPERIMENTAL FARM, CEDARA.

AGRICULTURE—GENERAL.

(*a*) Reclaiming of swampy vleis by tile and open drainage, subsoiling, liming, etc. The employment of water thus conserved in irrigation of reclaimed lands. Determination of outlay involved in these operations.

(*b*) Establishment of a truck farm under irrigation for the determination of the best methods available for the production of asparagus, celery, rhubarb, onions, etc., on the scale of field crops, and the place of pitting and forcing in such a scheme.

(*c*) Hillside cultivation and the prevention of surface washing by subsoiling, contouring, catchment drainage and the growth of intercultural crops.

(*d*) Deep cultivation (subsoiling) and its effect upon physical character of soils, water content in wet and dry seasons, stability of mineral manures, and growth and yield of staple crops.

(*e*) Rotations, and especially the cultivation of catch crops with drilled maize.

(*f*) Determination of absolute and relative values of different classes of kraal and stable manures; effect on physical characters, water content and surface-washing of soils; influence on growth and yield of staple crops; place in rotations; storage and conservation of such manures.

(*g*) Veld improvement; conservation from grass fires and influence on chemical and organic composition; increase in carrying capacity and feeding value by manuring, cultivating, etc.; introduction of European grasses for summer, and drought and frost-resisting forage plants for winter grazing.

(*h*) Efficiency of tillage implements and cultivation tools; relative draught as determined by a tractometer; effect of shallow and deep surface cultivators on growth and yield of staple crops.

(*k*) Green fallows and the application of green manures to soils, showing low natural fertility or deterioration.

MAIZE.

(*a*) Cross-breeding and selection of local varieties adapted to cultivation in the highland, midland and coast districts respectively, with early, medium and late maturity.

(*b*) Cross-breeding and selection of local varieties for milling, stock-feeding and silage respectively, with lower or higher proteid, starch or oil content, abundant or scanty leaf-growth, finer or coarser stalk, etc.

(*c*) Cultivation of maize with such catch crops as field beans and peas, wheat, oats, rye, rape, mustard, buckwheat, flax, etc., and the determination of effect on growth and yield.

(*d*) Effect of subsoiling, deep and shall surface cultivation, close and wide spacing, hilling and listing on growth and yield of grain and stover.

(*e*) Effect of heavy and light dressings of kraal manure, with and without additional mineral fertilisers, on the growth and yield of maize, and subsequent condition of the soil.

WHEAT.

(*a*) Breeding and selection of frost and drought-resisting winter wheats with special reference to the requirements of highland districts.

(*b*) Breeding and selection of rust-resistant spring wheats.

(*c*) Cultivation of winter-wheat on drained vlei land without irrigaiton; use of wheat harrow; effect of drainage, subsoiling, alkaline manures and seed selection on rust infection.

(*d*) Influence of grading of seed upon growth and yield.

(*e*) Influence of quantity of seed sown upon growth and yield.

(*f*) Cultivation of winter wheat as a catch crop with maize.

OATS.

(*a*) Breeding and selection of an early maturing forage oat.

(*b*) Breeding and selection of a rust-resistant, heavy, threshing oat.

(*c*) Influence of weight of seed sown upon growth and yield.

(*d*) Cultivation of oats as a catch crop with maize.

BARLEY.

(*a*) Breeding and selection of beardless types with high proteid content for stock-feeding.

(*b*) Breeding and selection of malting types with high starch content.

(*c*) Cultivation of barley as a catch-crop with maize.

MILLET.

(*a*) Relative yields, grain and straw, growing periods and nutritive values of different types of millet.

(*b*) Influence of mineral and organic manures dressed separately and in combination.

(*c*) Influence of quantity of seed and planting distance on growth and yield.

POTATOES.

(*a*) Influence of size of sets and distance of planting.

(*b*) Influence of sprouting of sets.

(*c*) Influence of mineral manures.

(*d*) Influence of organic manures.

(*e*) Influence of subsoiling, ridging and level cultivation.

(*f*) Influence of application of Vaporite, Bordeaux Mixture, and Paris Green.

(*g*) Selection of blight-resistant and heavily-bearing strains from main crop varieties.

(*h*) Breeding and selection of local types from seed.

(*k*) Experimental culture of newly-evolved types.

(*l*) Winter storage.

ROOTS (INCLUDING MANGOLDS, TURNIPS, BEET, SWEDES AND HORSE CARROTS.)

(*a*) Influence of subsoiling, deep and shallow ploughing on growth and yield.

(*b*) Influence of organic manures, with and without the addition of mineral fertilisers, on yield, chemical composition and nutritive value.

(*c*) Winter storage.

STOCK.

BUTCHER'S CATTLE.

(*a*) Winter-feeding of truck loads (or smaller lots) of Devon, Aberdeen-Angus and native steers with variously compounded rations.

(*b*) Determination of increase in live-weight by periods as influenced by character and quantity of rations and hereditary capacity of different types.

(*c*) Estimation of cost of rations and management, and consequently of increase in live-weight.

(*d*) Slaughter-tests for determination of proportion of dead-weight and character of carcases as influenced by rations fed.

(*e*) Feeding of butcher's calves with full milk and fortified skim-milk rations.

(*f*) Production of "baby-beef" by the use of concentrated feeds.

BUTCHER'S SHEEP.

(*a*) Establishment of a flock of butcher's (Persian) sheep.

(*b*) Determination of increase in live-weight by periods due to veld grazing alone, and to grazing combined with variously compounded rations.

(*c*) Estimation of cost of rations and management.

(*d*) Slaughter tests for determination of proportion of dead-weight and character of carcases as influenced by rations fed.

PIGS.

(*a*) Paddock feeding with rape, ground nuts, kale, beans, etc.

(*b*) Determination of gains in live-weight due to paddock-feeding and variously compounded rations.

(*c*) Slaughter tests, and determination of quality of carcases as affected by system of feeding.

(*d*) Curing and determination of quality of bacon as affected by rations fed.

POULTRY.

(*a*) Establishment of a model poultry farm.

(*b*) Determination of relative advantages of breeds in local conditions.

(*c*) Influence of rations on health, egg production and growth of pullets.

(*d*) Cost of production for eggs and pullets, as determined by cost of rations and management.

WINKEL SPRUIT EXPERIMENTAL FARM.

AGRICULTURE—GENERAL.

SUGAR CANE.

(*a*) Influence of distance of planting and the application of mineral manures on growth and yield of cane.

(*b*) Establishment of plantations with recently introduced varieties.

(*c*) Analytical determination of variations in sugar content due to variety and cultural methods.

TEA.

(*a*) Establishment of an experimental garden.

(*b*) Analytical investigations into the alleged deterioration of tea-lands, and determination of the influence of mineral and organic manures on continued growth and yield.

(*c*) Influence of mineral and organic manures, and distance of planting on annual yield.

And later:

(*d*) Influence of different methods of pruning on continued growth and yield.

COFFEE.

(*a*) Establishment of an experimental plantation.

(*b*) Study of leaf-disease and determination of the efficacy of local remedies, viz., firing with a grass mulch, etc.

(*c*) Influence of shade and shelter as furnished by native trees in partial clearings.

And later:

(*d*) Influence of mineral and organic manures on health and yield.

(*e*) Employment of indigenous (Inhambane) coffee as a stock for grafting.

(*f*) Cross-breeding and selection of indigenous coffee with a view to its adoption as a variety relatively resistant to leaf-disease.

FIBRES.

(*a*) Organisation of plantations with ten selected varieties of Sea Island, Egyptian and Long Staple American Upland cottons, which have given best relative results among an extensive number of types submitted to experimental culture in former seasons.

(*b*) Organisation of Sisal and Mauritius hemp plantations to determine influence of planting methods on growth and yield, suitability of soils and their influence on character of fibre.

(*c*) Organisation of a Ramie plantation to determine relative growth and yield on the coast and in the midland districts, total weight of fibre produced and cost of producion.

MAIZE.

(*a*) Selection of a heavily-bearing strain of Boone County Maize with long growing period, suitable for cultivation on the coast.

(*b*) Treatment of newly-cleared bush land in preparation for maize; influence of burning, liming, and the application of organic and mineral manures.

(*c*) Distance of planting, hilling, and the introduction of catch crops, such as lima bean and cow-pea.

BARLEY.

(*a*) Selection of a variety suitable for winter stock feed.

(*b*) Selection of a variety for malting purposes.

(*c*) Influence of mineral manures on yield of grain and straw.

POTATOES.

(*a*) Times of planting in relation to yield and blight infection.

(*b*) Influence of size of sets, distance of planting, and sprouting of sets.

(*c*) Influence of organic and mineral manures on growth and yield.

(*d*) Influence of spraying and de-flowering on growth and yield.

(*e*) Selection of blight-resistant and heavily-bearing strains from main crop varieties.

STOCK.

SHEEP.

(*a*) Determination of the suitability of Persian sheep to the coast districts.

(*b*) Influence of veld grazing with and without the addition of variously compounded rations on increase in live-weight over periods.

(*c*) Cost of rations and management, and consequently of increase in live-weight.

PIGS.

(*a*) Paddock-feeding of pigs on ground nuts, sweet potatoes, rape, cowpea and arrowroot.

(*b*) Influence of paddock-feeding and various rations compounded with grain, cane refuse, mollasses, etc., on gain in live-weight.

(*c*) Cost of production of pork under a system of paddock-feeding.

(*d*) Influence of such a system on quality of cured products.

WEENEN EXPERIMENTAL STATION.

IRRIGATION—GENERAL.

(*a*) Demonstration of methods employed in grading and surfacing land for irrigation.

(*b*) Relative effects of flooding and furrow irrigation on staple crops, and comparative costs of operations.

(*c*) Open and tile drainage, relative costs of operations, and influence on growth and yield of crops under irrigation.

(*d*) Service of irrigation waters and influence of quantities upon growth and yield of staple and truck crops.

(*e*) Irrigation in relation to mineral and organic manures as applied to drained and undrained lands.

(*f*) Investigation of alkaline precipitation and the influence of drainage; analysis of irrigation and drainage waters, alkaline deposits and soils.

CROPS UNDER IRRIGATION.

(*a*) *Lucerne.*—Influence of varieties; broadcasting and drilling; surface cultivation; manuring; quantities of water.

(*b*) *Wheat and Barley.*—Influence of varieties; times of sowing; subsoiling; drainage; alkaline manures; grading of seed; quantity of seed; drilling and broadcasting; zigzag and wheat harrows; cutting and feeding early growth, etc.

(*c*) *Potatoes.*—Influence of sprouted and unsprouted sets; ripe and unripe seed; number and season of services; green manures; methods of applying water, etc.

(*d*) *Maize.*—Influence of water on growing period; yield of grain and stover; soil temperature; rust and bacterial rot.

(*e*) *Truck Crops.*—Service of water required by asparagus, celery, onions, rhubarb, etc., and its influence on yield and quality of produce.

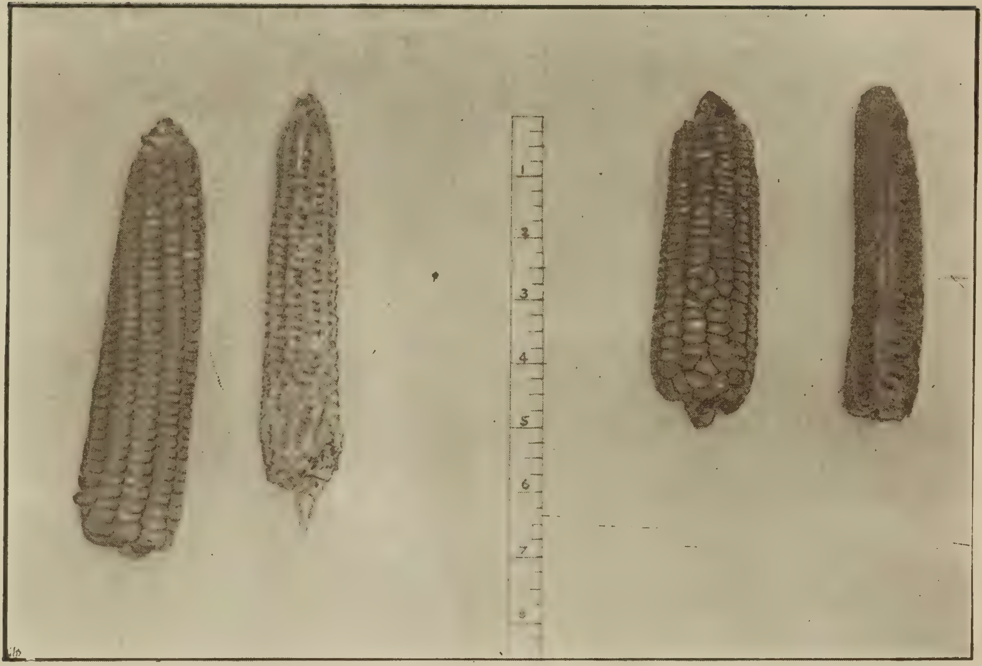
TOBACCO.

(*a*) Experimental cultivation of Sumatra, Cuban, Virginian and Turkish varieties.

(*b*) Fire-curing of Virginian Bright Leaf for cigarettes.

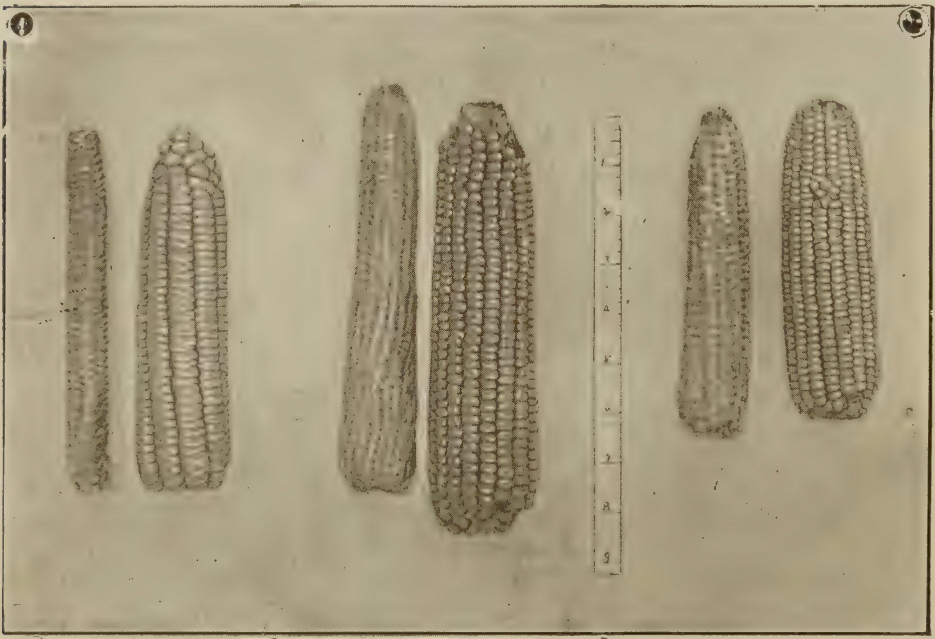
(*c*) Sun and fire-curing of Turkish Leaf for cigarettes.

(*d*) Air-curing of Sumatra and Cuban Leaf for wrappers and fillers of cigars.



SUGAR MAIZE OR SWEET CORN.

1. Stowell's Evergreen. 2. Dwarf Early.



DENT MAIZE (WHITE).

1. Hickory King. 2. Boone County. 3. Silver Mine.

Maize Cultivation in South Africa.

WITH SPECIAL REFERENCE TO NATAL.

By E. R. Sawer, Director Experimental Stations.

Sir J. B. Lawes, the great pioneer of scientific agriculture in England, speaking of maize on a memorable occasion, paid the following tribute to the world's leading food plant:—"My chief regret in not visiting America is that I shall die without beholding what I conceive to be the most superb crop that grows, as it is, in itself, the most valuable."

From its legendary origin as the gift of the Mondamin, the Great Spirit of the Indian, recounted by Longfellow in his agricultural epic, Hiawatha, to its employment at the present day, not as a rude, primitive food for man, but the basis of a hundred manufacturing industries, the history of maize has been nothing less than a romance. In 1498 Columbus writes to Ferdinand and Isabella from the Island of Hayti, describing a new cereal unknown in Europe, Asia, or Africa, grown by the natives in fields eighteen miles long and called by them "mahiz." Standing maize won in battle from their Indian foes by the early Puritan settlers in Eastern American proved ample argument for the adoption of the newly-found crop as their staple, which was forthwith destined to become the chief cereal food of the pioneers of two continents and the salvation of their stock during the hungry winters prevailing in the lands of adoption. Nor has its popularity declined with the days of the Pony Express and the Voortrekker, for the advance of civilisation has but multiplied its uses. Where climatic conditions favour the growth of the crop, maize is yearly becoming, with the development of the art of cooking, a more important element of human food. Where maize is grown extensively, live stock industries flourish, and in sub-tropical regions the geographical distribution of maize is in a general way an index to the distribution of live stock. And during the past few years scientific study and inventive genius have combined to demonstrate economic possibilities for maize and its products, which are as yet but dimly realised by the cultivator of the crop. At the Paris Exposition of 1900 there was exhibited a case containing one hundred and eight separate commercial products manufactured from maize. Alcohol, whisky and malt liquors are distilled from the grain. Glucose factories annually absorb more than sixty million bushels in the preparation of a product used in the manufacture of table syrups and confectionery. Maize dextrin and gum are employed for sizing cloth, and various grades of starches, from edible to laundry, are produced. Cellulose constructed from the pith of the stems finds employment in the manufacture of explosives, and as a packing for the sides of war vessels, owing to its property of rapidly swelling on being pierced and preventing further ingress of water. Stem fibres go to form paper, the husks mats and mattresses, and it has indeed been said that there is as much economic value in the stalks, when fully exploited, as in the crop of grain they bear. By-products of milling and manufacture are known and sold as germ oil, germ oil meal, gluten and gluten meal, hominy, distiller's grains, etc., and in demonstration of the limit to which the work has been carried, when the pith is removed for the manufacture of explosives, the remainder of the stalk, with husks and leaf-blades, is ground into a coarse meal and sold as "the new corn product." The Maryland Experiment Station found this more digestible than Timothy hay, for which it was successfully used as a substitute in feeding horses.

CLIMATE.

In the country of its origin there exist clearly defined areas known as "corn belts," within whose limits is found the best combination of temperature, sunshine, rainfall and soil for the successful production of maize. Within the individual Colonies of South Africa maize districts will ultimately gain recognition as possessing a similarly happy association of natural advantages. Outside such areas, where the absence of any one of these factors limits successful production, other crops will, as a general practice, be chosen, though men of special skill and intelligence may wisely work against peculiarities of soil or climate. It is in this connection that careful records of temperature and rainfall collected from a large number of stations over a period of years become invaluable to the farmer wishing to make a profitable selection of crops, and agriculturists are urged in their own interests and those of the Colony at large to devote attention to climatic variations occurring from season to season, and their apparent influence on the growth and productiveness of crops. A study of such influences, and a determination of the extent to which they may be controlled or modified by methods of cultivation, is the first step towards securing enhanced yields and further reductions in the cost of production.

Influence of Temperature.—It is the temperature obtaining during the growing months of January, February and March, rather than the mean for the whole year, and the temperature of the soil rather than of the air, which affect the growth of the maize crop. Sunshine is again a factor which is not fully expressed by thermometer readings, and yet exercises a powerful influence on production. The bulk of the American crop is grown where the mean soil temperature during the month of July ranges between 70° and 80° F. and the former figure (February being substituted for July) may be taken as our mininmum for profitable cultivation. Maize seed will not germinate at a lower temperature than 55° F., and if planted will rot in the ground. The character of the soil largely determines its temperature, and a well-drained, warm soil may register a foot below the surface some 10° excess of a reading taken in the open. On the other hand a cold, water-logged soil suffering from want of drainage, may prove cooler than the overlying air, and no plant perhaps is more susceptible to "wet feet" than maize. Continued rains may on such land prove injurious rather than beneficial by further reducing the temperature of the surface and subsoil. Within certain limits no relationship may be traced between yield per acre and temperature, especially when the readings exceed the minimum stated above, but as soon as they fall below this, the maturity of the grain, and therefore its saleable yield, will be affected. Unsound grain is frequently shipped from colder districts lying beyond the limits of the economic maize area, especially after inclement seasons. The following statement from the New York State Station illustrates the effect of a fall in temperature in such a situation on the character of the grain. It will be observed that this fall bears an apparent relationship to a relatively heavy rainfall, and that the yield suffers little in quantity, but much in storage capacity. This furnishes but one of the many available arguments in favour of the thorough drainage, whether natural or artificial, of the maize field:—

Year.	Maturity of Grain.	Mean Soil Temperature.	Rainfall.		Yield in Bushels.
			June and July.	September and October.	
1884	Well ripened	71·4°	8·14	3·34	63·8
1882	Fairly ripe	67·8°	8·91	1·83	50·2
1883	Rather moist but safe binned	63·5°	13·53	4·64	58·6
1885	Very moist, moulding in bin	67·5°	14·67	4·64	58·8

Influence of Rainfall.—Subject to the above reservation, the yield of the maize crop bears a definite relationship to the rainfall, and to its distribution during the four growing months, December to March inclusive. King* has determined the amount of water evaporated from the maize plant and the surrounding soil to be in Wisconsin 270lbs. for each pound of dry matter grown, equivalent to 2·4 inches for each ton; this is only about half that required by oats and clover. Maize is, however, very greatly influenced by the water supply during the period of most rapid growth, which in South Africa corresponds with the months of January and February. Hunt** has ascertained that the growth of maize in one week in July in Illinois to be equal to 1,300 pounds of dry matter per acre, which would require, according to the experiments of King, 1·5 inches of rainfall. At such times, unless the physical conditions of the soil are the best, the plant is apt to suffer from drought. Heavy rains and cloudy weather, on the other hand, during November and December, are likely to decrease yields. The most favourable conditions for the growth of maize are comparatively heavy rains at considerable intervals, with hot, sunshiny weather in the meantime. Deep cultivation and drainage will in all cases modify the undesirable effects both of excessive precipitation and deficient rainfall.

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* "Physics of Agriculture," page 139.

** "Cereals in America," page 207.

SOILS AND MANURES.

Maize is influenced perhaps in greater degree than any other cereal by the character of the soil in which it is grown. This factor cannot be regarded as beyond the control of the farmer, for field soil becomes, when cultivated for a period of years, what is virtually an artificial product adapted by the skill of the cultivator in both its chemical and physical features to the specific needs of the crops grown thereon. Many of our vlei soils and swamps contain reserves of plant food, which would suffice to meet the requirements of several successive maize crops without being supplemented by commercial fertilisers. The texture and mechanical conditions of such soils, however, frequently render these natural resources unavailable until such time as physical features have been modified by a system of subsoil drainage. Some compensation, on the other hand, is found for the relatively low natural fertility of hillside lands in a generally excellent natural drainage, but successful cultivation will include at the outset a system of manuring calculated to make good deficiencies in mineral and organic food supplies.

An average crop of maize, yielding ten muids of grain and four tons of stalk per acre, will remove from the soil approximately 88lbs. potash, 80lbs. of nitrogen, and 55lbs. of phosphoric acid, and the standing problem confronting the maize grower is the determination of the best and most economical method of returning these substances to the soil, and the avoidance of impoverishment due to constant cropping. That maize, at its present market values, can be grown for a profit on some of the least fertile soils under cultivation in Natal has been amply demonstrated at the Central Experiment Farm, Cedara. The method employed has been the application to such lands of variously compounded dressings of chemical manures, and the results secured are briefly as follows:—On unmanured hill soils repeated cropping tends to rapid exhaustion, the fourth year's crop of grain being less than a quarter by weight of that secured during the first season, and cultivation ceased to be profitable after the second year. Dressed, however, with chemical manures the same class of land shows a steady improvement, indicated by better crops secured at the end of four years' treatment. The most striking feature of the results is the disastrous effect of leaving out the phosphates, without which the yield was little better than without manure at all; in fact, individual plots yielded less when nitrogen and potash were given than was obtained from the neighbouring unmanured plots. There was 25 per cent. less grain and 19½ per cent. less stalk harvested when potash was omitted from the dressing, and the gradual exhaustion of the potash present in the soil is shown by the diminishing yield of grain from year to year when potash manures are not used. On the other hand increasing benefit is experienced from the repeated application of potash in combination with phosphates. A most satisfactory discovery was the fact that a little more grain and the same amount of stalk was secured without nitrogen than when this was supplied, and there is further apparently no progressive exhaustion of the nitrogen in the soil; this is in keeping with the experience of growers in other parts of the world, when maize is for this very reason coming to be regarded as a restorative rather than an exhausting crop. Wheat, oats and other similar daintily-feeding small cereals demand an ample supply of available nitrogen in the soil, and exercise a relatively exhausting effect, but maize possesses a wonderful capacity for foraging, and an ability to collect nitrogen in many forms, as well as other elements of nutrition. Whether the plant, in common with legumes, actually takes up nitrogen from the air, has not been definitely demonstrated, and some investigators prefer to attribute the supply to the increased formation of nitric acid in the soil during the hot months of the year when the growth of the maize plant is most rapid. It is a remarkable advantage which maize possesses over the other cereal grain crops in that it continues growing throughout the summer and ripens in the autumn, and that its most vigorous growth and assimilation ensue just when soil nitrification is most active, and when the other cereal crops have completed their development.

As alternatives to the use of highly-priced commercial fertilisers, and as means of keeping the land in good condition for growing maize, the writer would urge the importance and value of kraal manure and the rotation of crops in connection with stock-feeding. At the close of the current season it is trusted that there will be available from our own experiments concrete facts to support a plea for the use of organic manures. In the meantime one cannot do better than quote a single authentic experiment conducted by Professor Latta, at the Indiana Station. A series of alternate plots were dressed for two years with fresh horse manure amounting in all to about 50 tons per acre. The land had grown maize continuously for five years prior to the commencement of the experiment. No manure was used before or after. During the twelve years succeeding those when the manure was given, the average yield was nearly ten bushels per acre more on the manured than on the unmanured plots. The effect of kraal manure is thus more lasting and constant than that of the readily soluble commercial fertiliser; it supplies organic matter, or "body," to soils deficient in humus; it modifies the water content of such soils, maintaining more moisture in the upper three feet of the ground; checks surface washing during heavy rains; and frequently contains the necessary mineral elements, phosphates and potash, in the cheapest available form. One ton of well-conserved kraal manure should contain nine to fifteen pounds of potash and nitrogen, together with four to nine pounds of phosphoric acid, and a dressing of ten tons per acre will, in terms of the requirements of the maize crop, as stated above, more than suffice to meet the season's call, and leave a residue available for consumption by succeeding crops. Hunt* instances cases where no influence whatever was obtained from the use of large quantities of commercial manures, but where the use of kraal manure increased the crop.

MAIZE IN ROTATIONS.

Apart from the direct benefit it may derive from a dressing of kraal manure, maize plays an important part in any rotation by preparing the soil and its manurial contents for the following crop, which would profitably be potatoes. The latter furnish the "money crop" of the farm, and are therefore fed on the choicest food. By ploughing under a heavy dressing of kraal or a green crop of legumes, and "straining" the humus thus obtained through a crop of maize, soil is secured which, if further fortified with a dressing of mineral fertiliser, should so increase the yield and quality of the potatoes, that the cost of cultivating the maize may well be debited to the latter crop, and the maize harvest be regarded as pure gain. Oats or wheat may then follow the potatoes without further manuring, and the rotation be completed with leguminous crop, such as soy bean or cow pea, which is either ploughed under or fed to stock. As stated above, the secret of this beneficial influence of maize lies in the fact that the hot summer is particularly favourable for the action of chemical and bacterial processes of the soil, including the changing of inert nitrogen into active nitrate or ammonia, and in converting kraal manure and all coarse material into available plant food.

The difficulty of finding staple and profitable crops to take the place of maize in rotation is being obviated by the far more extensive cultivation of feeding crops, and the above system may be modified by the substitution of roots, barley, flax, rape, ground nuts and other soiling crops to suit the requirements and convenience of individual cultivators, the general principle being maintained that heavy manures are to be given in the first place to the maize crop.

CATCH CROPS WITH MAIZE.

Closely related to the question of rotation is that of the cultivation of catch crops, which, regarded as a means of shortening the period occupied by the rotation and increasing the output of produce from a given acreage, is one of considerable importance. The inter-planting of drilled maize with such crops as soy and Lima beans, cow peas, wheat, oats and rye, rape, ground nuts, vetches, mustard, pumpkins, etc., is a regular system in many maize districts, justified by lengthy experience of satisfactory results. Such catch crops may be introduced at any suitable time during the growth of the maize from planting to the last cultivation; the latter operation, if regularly performed, leaves the soil between the rows of maize in execellent tilth, furnishing a good seed bed for even such exacting crops as wheat and oats. In this connection it may be found advisable to increase the planting distance between the rows of maize to allow for the passage of a wheat drill during the month of February. The system may be justified by the fact that the yield of maize is little influenced, and on certain classes of soil may be even increased, by wider spacing. This fact has been particularly noticeable in coast plantations where maize planted among coffee with a spacing of ten feet between the rows has been found to give better returns than were secured from fields in which the standard spacings of thirty-six or forty-two inches had been adopted.

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* "Cereals in America."

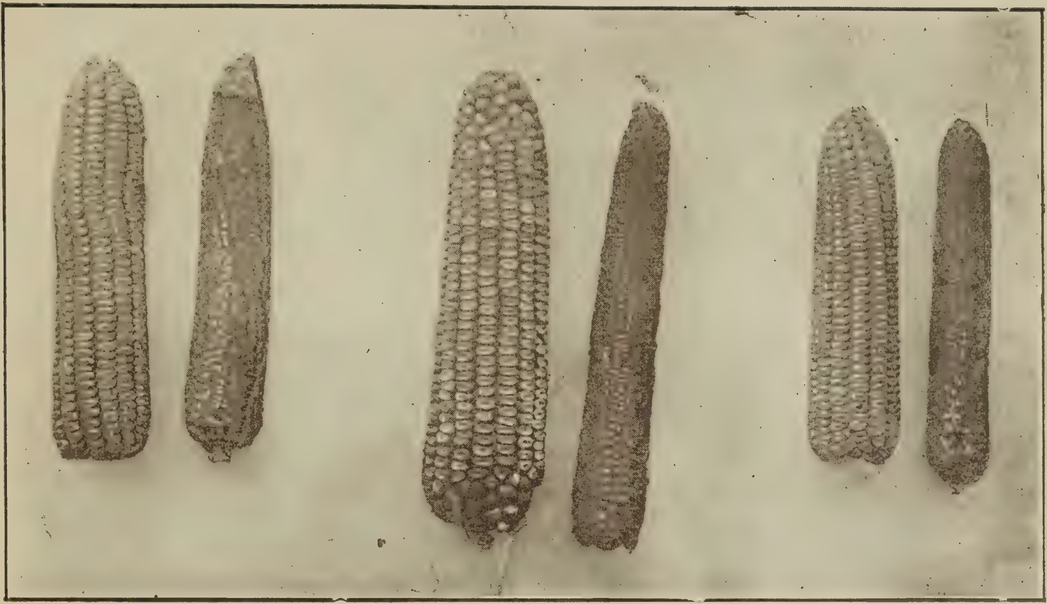
When a winter catch crop of wheat or oats is contemplated, a variety with a short growing period, such as barley-wheat or Indian oats, is advocated, which, maturing soon after the early rains, permits of spring ploughing and the December planting of the ensuing crop. If a feeding crop of legumes be required, this should be drilled between or in the rows of maize. Drilling is here preferable to broadcasting, as it allows of cultivation with weeder or horse-hoe. For our upland and midland districts no better crop could be selected than the soy bean, which is hardy, bushy in habit, and does not suffer from the attacks of beetle. In the coast section, however, the cow pea and the Lima, or kafir, bean, with a more tropical habitat, will give better results. Five or six foot spacing for the mealies, with a single intermediate drill of beans, will, in most cases, give a maximum return per acre. The legumes may be cured as hay or silage, or the beans harvested for a grain ration. When the ground is in need of organic manure, an alternative method is to broadcast the beans prior to the last cultivation of the maize and work the seed in with the horse-hoe. In this case the leguminous crops will not mature, but the vines will furnish a dense mass of green manure, which, if ploughed under in the autumn while the ground is still damp enough to rot the vegetable matter, will do much towards restoring exhausted land to fertility, and put "body" into soils lacking in humus. Rape and kale may be similarly drilled with the last cultivation of the maize and furnish excellent soiling crops for stock late into the winter, while buckwheat, flax and mustard may be broadcast late in January and harvested at or about the same time as the maize crop. That the system outlined above entails heavy applications of mineral manures in the shape of phosphate and potash, is not denied, for this is a necessary outlay wherever extensive cultivation is practised, and an economy is effected in other cultural operations when a two-crop course is organised during the single season on dry land. The nett profits gained from the double harvest should far more than suffice to meet an additional manure bill, and the provision of an ample supply of winter stock-feed is a consideration of the first importance.

TYPES AND VARIETIES OF MAIZE.

A sound system of maize culture must be based upon a clear understanding of the different types and varieties, their habit of growth, characteristics, for relative suitability of a variety may, apart from other influences, modify the harvest secured and the consequent profits reaped. In making such a selection, two main considerations must receive attention, namely, the capacity to mature a crop in a given locality, and, secondly, the relative yield of the product sought, whether this be grain, forage, or both.

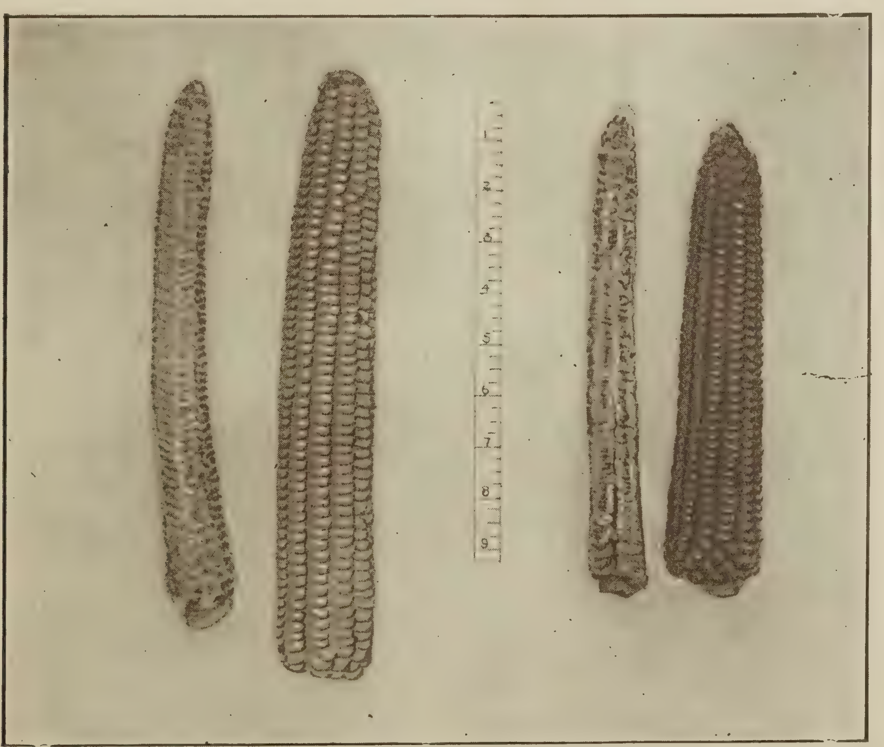
Botanically, all types and varieties of cultivated maize may be attributed to a single species, *Zea mays,* and their individual features are to be regarded as modifications induced by environment and cultivation. Nowhere has maize been found in the condition of a wild plant, and the original or parent type is therefore unknown. Concensus of opinion, however, favours Mexico as the original centre of distribution, and here the aboriginal Indians have for centuries grown corn resembling that discovered in the ancient tombs and burial mounds of the country. This possesses a soft, starchy, rounded kernal of very variable colour, red, blue and pinkish grains alternating with white or yellow. A closely related, if not identical, variety has been unsuccessfully cultivated in South Africa under the name of Cuzco or Peruvian maize. A reversion to such ancestral types frequently occurs in crops grown from seed which is the product of years of selection, and it has been a common South African experience to detect red or dark blue kernals in cobs raised from imported pedigree seed of undoubted parentage. The almost innumerable varieties of cultivated maize have been divided into a number of groups by Dr. E. S. Sturtevant, who has given the matter exhaustive attention with a view to placing the hitherto confused nomenclature upon a sound scientific basis. This grouping depends upon the internal structure of the kernel, and the presence of a husk or pod to the individual kernels of what is presumed to be the aboriginal form. If a grain of maize be cut through its longest diameter, the internal substance or endosperm will appear to consist of two parts, namely, an opaque, whitish portion, and a glossy or horny portion, and the difference of the following types is due to the arrangement and character of this endosperm, which often result in marked variations in the shape of the grain:—

Zea tunicata, Pod Maize.—In this group each kernel is enclosed in husks. The plants of this type are excessively leafy, and sucker abundantly. The tassels frequently bear kernels. The grain varies widely in colour, which suggests that this may be the primitive type, a supposition



DENT MAIZE (YELLOW).

1. Yellow Dent. 2. Leaming. 3. Golden Eagle.



FLINT MAIZE.

1. Rural Thoroughbred Flint. 2. Long-fellow.

supported by the fact that cultivated varieties frequently revert to these characters. Pod maize has little commercial value and is rarely grown.

Zea everta, Pop Maize.—This group is characterised by the excessive proportion of the horny endosperm, and the small size of the kernels and ear. The grain of the best varieties has a horny endosperm throughout, and, when exposed to a high temperature, explodes into a white, fluffy mass, the endosperm being everted round the germ and hull.

Zea indentata, Dent Maize.—This group is readily recognised by the occurrence of a starchy endosperm enclosed in a horny endosperm at the sides of the kernel, the starchy endosperm extending to the summit. By the drying and shrinkage of the starchy matter the summit of the kernel is drawn in or indented in various forms. In different varieties the horny endosperm varies in length and thickness, thus determining the character of the indented surface.

Zea indurata, Flint Maize.—Here the split grain shows the starchy endosperm completely surrounded by the horny endosperm. The latter usually prevents the grain from denting upon shrinkage, but if very thin at the top a slight dent may result.

Zea amylacea, Soft Maize.—This group is at once recognised by the absence of horny endosperm. Owing to the uniformity of the shrinkage in ripening there is usually no indentation, yet in some varieties an indentation may more or less frequently appear, but splitting the kernel invariably determines the class.

Zea saccharata, Sweet Maize.—A well-defined group characterised by the translucent, horny appearance of the kernels and their more or less crinkled, wrinkled or shrivelled condition.

Of the above types sweet and pop corns are cultivated rather as vegetable garden or truck farm crops, while soft or bread maize has little to recommend it for local adoption, requiring, as it does, a long growing period, storing badly, and being very subject to the attacks of insects and fungoid diseases. The Dent and Flint types therefore alone merit detailed attention as the basis of our field crops. Within these types numerous varieties have been evolved with characteristic features. The latter are partly referable to the effects of climate and soil, but more particularly to that of artificial selection whereby they have been profoundly modified to meet the specific requirements of individual growers. Similar influences are now being brought to bear upon South African crops with the consequence that new features may be detected in varieties introduced at an earlier or later date from the New World. For maize is one of the most plastic crops under cultivation, and within two or three generations shows to a marked degree the effects of natural or artificial influences. It responds to selection as readily as do beets or live stock, and there is scarcely any limit to the value of the results which may be thus secured. Maize may be bred to mature within a longer or shorter growing period, for heavy foliage or light, for tall plants or short, for ears placed low down or high up, for one ear or for two or more ears to the stalk, for heavy or light husks, for size and shape of ear, for size, colour and shape of kernel, for better milling qualities, for higher or lower contents of starch, oil or protein, for greater resistance to disease or insect attacks, and, most important of all, for increased yield.

DENT MAIZE.

This type includes the majority of varieties known to South African growers, which vary widely in growing period, character of ear, and size, shape and colour of grain. Speaking generally, they are characterised by the absence of suckers unless planted very thinly, by the presence of a single ear of rather large diameter carrying a relatively large number of rows, and by deep and wedge-shaped kernels.

The following have been widely cultivated in South Africa:—

Boone County, White.—Introduced from Indiana, U.S.A., and grown for several seasons in Rhodesia, Natal and Transvaal, where it is rapidly becoming a standard variety in districts favouring its growth. It is a rank feeder with extensive root system, and has yielded record crop on rich, heavy vlei soils. Stalk is coarse, stiff and not easily lodged by wind. Has been bred for large ears, and consequently matures slowly, taking 110 to 120 days in America, and from 135 to 150 in South Africa. Complete acclimatisation will probably shorten the local period of growth. Several ears may be set to a stalk. These are cylindrical, 8 to 12 inches in length, and 7 to 9 inches in circumference, according to fertility of soil. Cob white. Kernels deep, wedge-shaped and very closely fitting. Rows 16 to 24. Butts and tips well filled. Ears shell 80 to 88 per cent. of grain, weighing 10 to 16 ounces. Hardy and resistant to rust. Recommended for silage.

Silver Mine, White.—Introduced from Illinois, U..S.A., and already a favourite with many South African growers. Resembles Boone County, but not so sturdy in growth, and has an earlier maturity, the growing period being from 100 to 110 days in the United States and 120 to 130 in South Africa. Ears slighter and smoother, and shelling a higher percentage of grain, the standard being 90 per cent. Length should reach 9 inches and circumference 7. Cob small, white. Kernels deep, closely fitting and creamy white in colour. Number of rows 16 to 20. Stands next to Boone County in point of yield of grain. A good silage crop.

Hickory King.—An early introduction from the Southern States of North America, where it is grown on the less fertile upland soils. This variety possesses an ability to make a fair crop in adverse conditions, and should be chosen for lighter, sandy soils. In such a situation, or when dry weather is experienced during the growing season, it will in all probability yield a better return than the above. It is not, however, a gross feeder, and on very fertile lands cannot take advantage of the available plant food to the same extent as the larger varieties. There is an early limit to the size of the ears, and, as far as can be observed, there is no tendency to set a larger number to the stalk when conditions warrant this expansion. Ears from 6 to 8 inches in length and from 4½ to 6½ in circumference. Cob is small and should be white. Kernels broad, thin, square and horny white with a white cap. Several strains are grown with a varying number of rows, of which that with an eight-rowed ear is most commonly seen. Those, however, with a larger number of rows appear to shell a larger percentage and greater absolute weight of grain. The length of growing period is very variable in South Africa, varying from 125 to 160 days. Somewhat subject to rust. A good cilage crop.

Yellow Leaming.—One of the earliest recognised varieties, originated by Mr. J. S. Leaming, of Ohio, in 1826, and subjected ever since to a careful system of selection. This extended period of breeding has strongly fixed the following characteristics, which are the most constant of any of the varieties of yellow corn, the majority of which have been evolved from the Leaming. The plant is inclined to be tall and slender; ears are long and tapering, ranging in length from 8 to 11 inches, circumference being 7 inches. From 16 to 24 closely-fitting rows of deep, reddish-yellow, wedge-shaped kernels with square cut tops and straight edges. Cob red and somewhat swelling at the butt. Percentage of grain to cob has a standard of 88 per cent. Medium early maturity with a growing period in South Africa of from 120 to 130 days. Has yielded well in many districts, and furnishes a god silage crop.

Golden Eagle.—Originated by Mr. H. B. Peny, of Illinois, in 1871. Has been cultivated for several years in various parts of South Africa, and especially in Rhodesia, where it is a general favourite. The plant is strong and a gross feeder, taking the place of Boone County as the best yellow variety for heavy and fertile soils. The ears are rather small with a standard length of 9 inches and circumference of 7 inches. They shell from 86 to 92 per cent. grain. Kernels somewhat loose on cob and of a bright yellow colour, deep and wedge-shaped, with a deep indentation. Cob small, red. Growing period in South Africa from 125 to 145 days.

Yellow Dent.—An American variety which has been cultivated in South Africa with contradictory results. It has a history of 50 years of selection, and the characters are consequently very constant. The plant is tall and slender, with rather small ears. The rows vary from 18 to 24 in number, and are closely packed. Kernels deep and wedge-shaped, with medium deep indentation. Colour a light, golden yellow, with occasionally reddish-yellow ears. Matures in South Africa in from 120 to 140 days. Suffers badly in certain localities from rust.

Funk's Ninety Day Yellow.—In America is one of the earliest varieties, maturing in from 90 to 110 days, according to season. Has only recently been introduced into South Africa, but seed was widely distributed, and a growing period some ten days in excess of that stated above has been established. The plant and ears are relatively small, and, as might be expected, the yield of grain does not equal that of the more slowly maturing varieties. Ears somewhat tapering, with 14 to 20 rows of deep, wedge-shaped kernels. The latter are of a bright yellow colour, with a deeply indented, rough crown. Cob small. This variety should be useful for early and late planting.

Golden Ball.—Closely resembles Leaming, but originally showed a very early maturity. Grown for five years in Rhodesia, and originally ripened in less than 100 days. The period of growth has, however, been lengthening each year, and now varies between 110 and 140 days.

Early Yellow Mastodon.—A favourite early variety in the Transvaal. The plant is stout and leafy, and carries a large tapering ear, with a length of from 8 to 11 inches, and circumference of from 7 to 9 inches. From 14 to 20 rows of shallow, rounded, bright yellow kernels. Cob large. Growing period ranges between 105 and 125 days, according to season. Makes an excellent silage crop.

A number of other varieties have been recently introduced, but more extended trials are necessary before a verdict can be passed upon their relative merits. The term Horse Tooth has been applied to so large a group of varieties, including those showing early and late maturity, white and yellow grain, and other so widely diverging characters, that the name has lost all definitions, and cannot be employed in the present connection. It will be possible to add from time to time to the above brief list of such varieties grown in South Africa as possess certain fixed and stable characteristics enabling growers to study them in a systematic manner.

FLINT MAIZE.

The varieties falling under this type owe their specific characters to cultivation in the cooler climate of the eastern and nothern United States. This environment has induced the evolution of a protecting, horny, seed coat, which completely envelopes the softer, starchy endosperm. As a consequence, the development of a deep kernel is prevented, and the grains are generally broad and shallow. This feature accounts for the early maturity of the plants, which ripen in from 80 to 95 days, their relatively small size, and absence of heavy foliage. The type is further distinguishable from the majority of dent varieties by the smaller number of rows in the ear, which are generally eight in number, and never exceed fourteen. As a whole, the yield of flint varieties in both grain and stover is considerably lower than that secured from those of the dent type, and wherever the common varieties of dent maize will ripen, flint maize is not usually desirable. It may, however, have its place in our colder districts and higher altitudes, when the growing season is necessarily a short one. Hitherto but little attention has been given to the type in South Africa, but the following may be mentioned as having given relatively good results to experimental cultivation:—Longfellow, Canada Yellow, North Dakota and Thoroughbred White Flint.

(To be Continued.)

Report of the Conservator of Forests.

JULY, 1904, TO JULY, 1906.

The following is the introduction to and summary of the Conservator of Forests' Report for the above period. The full report is in the printer's hands and will shortly be obtainable on application:—

1. In accordance with instructions two brief interim reports have been submitted during the two-year period under review; these have been published in the *Agricultural Journal* for April, 1905, and January, 1906, respectively.

The office continues to control:—1, Forestry; 2, Fruit Culture; and 3, Certain Game Reserves, and is worked in direct communication with the Minister of Agriculture.

2. SUMMARY.

The work includes:—

1. Forestry:

(*a*) The administration of the indigenous Crown Forests, worked from 25 Forest Stations by 2 District Forest Officers, 15 full-time Foresters, 10 part-time Foresters, and 9 Native Guards.

(*b*) The issue of additional regulations dealing with special cases as they have arisen.

(*c*) The demarcation of 48,979½ acres, making the total Forest now demarcated 64,884 acres.

(*d*) The afforestation at Cedara of 597 acres, making the area now under trees there 1,004 acres, and 100 acres partly prepared.

(*e*) Nursery work at Cedara, including 284,503 trees issued to the public and supplied to other stations or Departments, in addition to all required departmentally at Cedara, and 249,219 trees still on hand.

(*f*) The afforestation at Empangeni of 270 acres in more or less tropical kinds.

(*g*) The formation of 134 acres plantations for the supply of hut wattles to natives, and for the protection of indigenous forests. These are at seven Forest Stations.

(*h*) Investigation of Mallet Bark, and encouragement of Black Wattle Industry.

(*i*) The collection of Forest Revenue, £1,475 15s. 10s., in 1904-5, £2,252 11s. 6d. in 1905-6, besides trees and produce supplied to other

Departments, against book entries, £141 10s. 1d. in 1904-5, £202 0s. 1d. in 1905-6; total, £4,070 17s. 6d.

(*j*) The erection of 7¾ miles of fences, making the total belonging to the Forest Department now 22½ miles.

(*k*) The construction of temporary Foresters quarters at all stations held by full-time Foresters not previously housed.

(*l*) The measurement of Sample Areas of indigenous forest in the best indigenous Reserved Forests.

(*m*) 271 prosecutions for forest offences, yielding about £394 4s. in fines.

(*n*) The leasing of 610 square miles in Amatongaland for the extraction of rubber.

(*o*) The publication of "Tree Planting in Natal."

(*p*) Advice given to all applicants *re* Forestal matters, including many articles in the *Agricultural Journal*; personal visits to many localities, public lectures, judging at shows, etc.

(*q*) Instruction given to students at Cedara in Forestry and allied subjects.

(*r*) Investigation of possible or probable minor forestal industries.

(*s*) Preparation of sample logs of Natal Grown Timbers, and formation of a Forest Herbarium.

2. FRUIT CULTURE:

(*t*) Planting and maintenance of experiment Orchards at Cedara, Weenen and Winkel Spruit.

(*u*) Public Lectures and much correspondence with fruit growers, advising in regard to kinds, treatment, packing, etc., or fruit, and making personal visits where necessary.

(*v*) Instruction given to students at Cedara in Fruit-culture, Horticulture, and Botany.

(*w*) Collection and despatch of local fruit to Royal Horticultural Society's Shows, London, reporting on same, and making experiments in cold storage of fruit.

(*x*) Many articles in *Agricultural Journal* on Fruit Culture.

3. GAME RESERVES:

(*y*) The maintenance and partial fencing of the Giant's Castle Game Reserve of 20,000 acres, and erection of a cottage thereon.

(*z*) The protection of eland and other game on Crown Land in Impendhle and Underberg Divisions.

Presentation to Conservator of Forests.

ON Thursday (3rd inst.) afternoon Mr. T. R. Sim, Conservator of Forests, was presented by the staff of the Forest Department with a handsome silver salver, suitably inscribed, on the occasion of his leaving for England as Natal Representative to the South African Products Exhibition.

Richmond Agricultural Society.

THE following is taken from the Annual Report of the President, Mr. John Marwick:—

The mealie crop was considerably under that of previous seasons, although the acreage reaped was quite as large, due in a large measure to the continued dry spells during the season. Europeans reaped about 70 per cent. of what they did the previous season, and the natives not above 40 per cent. The failure of native crops was largely due to their having been cleaned in a half-hearted way, as the natives were in hopes of having ours to reap, and it would be a waste of energy on their part to hoe their own. By the time it had dawned on them they would have to, perhaps, fall back on their own, it was late, and the weeds had done the damage. The land they cultivate, or rather, I should say, plant, is getting pretty well worn out, and the time when they could shift to fresh ground when the old is getting weedy and worn out is past. The country is getting too thickly populated for that now, so that it will be only in exceptionally good seasons that they will in future grow sufficient to feed themselves, unless they fertilise the same as the Europeans do. I know two natives who purchase fertilisers, with the result that they have always some mealies to sell and sufficient to feed themselves. The natives have acquired a taste for luxuries, and their habit of carrying small lots of mealies to the nearest store to exchange for sugar, etc., will, except in very good seasons, make then purchasers of mealies for part of the season. I have known women take part of a bag that had been bought "on tick" from a farmer to a store to exchange for sugar, because the food would not go down without. The men pretend that it is done without their knowledge, but they share the sweets all the same, and cannot help knowing how they have been obtained. All the crops last season were below average, and particularly the late crop of potatoes.

Increasing areas are being planted annually for stock-feeding purposes, but with the late springs that we have had during recent years it is usually all finished before the rains come, and grass for the stock. Considerable damage has been caused to the crops now in the ground by the heavy rains we have had lately, and I notice that those farmers who cultivate their land properly have suffered most. The ground being loose and no live weed roots to help to hold it together, it washed away more readily until one commences to ask himself if it is advisable to keep the land quite free from weeds and well tilled. It undoubtedly does in dry seasons, but when rains like those we have had lately are the order it is doubtful.

The planting of Paspalum in this district appears to make very slow progress. The reason I am unable to give, unless it is that it seems to furnish an ideal breeding ground for ticks, and people are therefore shy of it. From what I can gather from those who have any quantity of it growing, and graze animals on Paspalum, in a tick country like this they will soon find it necessary to erect dipping tanks. If its cultivation will induce farmers to erect dipping tanks it will be a blessing, apart from its merits as superior feed over the ordinary veld grasses, which are fast becoming principally ngongoni (wire grass). It was fortunate for the farmers that the native trouble in this district did not occur earlier. It happened at what might be termed a "slack time." The weeding was over and it was rather early to plant the late crop for feed purposes.

We are threatened with East Coast Fever, which unfortunately entered the Colony some time back. It is to be hoped that everybody will loyally co-operate with the Veterinary Department, when I feel sure it will not spread to any great extent, and we will be able to get rid of it in time. Otherwise, if we hamper the Department and put obstacles in the way, as I am sorry to notice several seem inclined to do, we are going to make it endemic. Loyally co-operating with the vets. probably will be inconvenient at times, I admit, but everybody should bear his share and not try to shuffle out when the shoe pinches. I regret that at recent public meetings it was decided not to have this district placed in quarantine. This district was visited by swarms of locusts some time back, which laid their eggs over a large portion of the district. The hoppers are now causing considerable trouble and expense. Farmers are energetically poisoning them, but the unoccupied farms are harbouring large swarms. No one is doing anything to kill them. Those who are unfortunate in joining unoccupied farms, having rid themselves of the locusts, will have these swarms coming over the boundary and be compelled in self defence to attend to them too. Owners of unoccupied farms should be made to kill the locusts and not be allowed to put it off till the hoppers are big enough to travel to adjoining lands, thereby having the job done "on the cheap."

During last year the Society came to an arrangement for the erection of a building for storage purposes in the corner of the show yard abutting railway siding, which has been completed. The new building has been taken full advantage of in the way of storage. Debentures for the erection of the building were taken up chiefly by those who are large producers and interested in providing storage close to rails, which enables them to give prompt delivery and take advantage of the market.

I regret to have to record the death of one of the Society's foundation members, in the person of the late Mr. Peter Flett. His removal leaves a blank in the Society and the district, another of the old landmarks gone. He, as you all are aware, was a relative of mine, so it would be out of place for me to say anything further in this connection. Owing to the Show having been abandoned there were not so many committee meetings held as usual during the year. In conclusion, gentlemen, I wish to thank the Committee for its support, especially the Hon. Secretary and Hon. Treasurer, for their untiring efforts on behalf of the Society; also Mr. A. W. Cooper for time and trouble taken in getting through the debentures *re* storage building. I beg to thank the members for having elected me as President, and express the wish that some one else be now promoted to the office. The post of President is the "blue ribbon" of the Society and should move round the members. Its doing so will be an advantage to the Society, as when one man is kept long in an office things are sure to get into grooves.

Experiment Farms.

CEDARA.

Report for the four months ending 31st December, 1906, from Farm Manager, Central Experiment Farm, Cedara, to Director of Experimental Stations:—

I have the honour to submit the following report of the work done, and progress made on this branch of the Farm, for a period of four months ending 31st December:—

From the beginning of September until the date on which you arrived here to assume office, viz., 15th October, attention was being devoted to the carrying out of Mr. Pearson's final experiment instructions for 1905-6. Previous experience has borne out that unless our detailed instructions are issued early in the season (about September) the work becomes immediately in arrears; and, as every farmer knows too well, when once this is so, it is difficult to bring into line again. In view of your appointment having been effected so late in the season, obviously by the time your instructions were ready the season was well advanced. It will, therefore, I am sure, be reasonably admitted that all concerned have been heavily handicapped under such circumstances. Within a few days of your arrival instructions were received, and the work was put in hand as soon as it was practically convenient.

At the outset it was decided that various maize experiments should be conducted on a more extensive scale than had formerly been done; and the ground selected for the purpose, being beyond the boundary originally allocated for experiments, had of necessity to be surveyed and plotted off. At date of writing there are approximately 100 acres under experimental crops, all of which require constant attention in the way of surface cultivation, weeding, etc., while at the same time other crops are in process of planting. On the whole the work has been got fairly well in hand, and I take this opportunity of recording my appreciation of the earnest attention and desire the Field Experimenter, staff and students alike, have shown to have the work efficiently done and carried through with the minimum of delay.

The rainfall for the period under review has certainly been most satisfactory, and has shown an increase of 8·92 inches on the corresponding period of last year:—

	Inches.
September	3·89
October	4·16
November	6·71
December	3·71
Total	18·47

On several occasions heavy rainfalls, causing damage by wash around buildings and along roads, have been experienced, but surface drains to the extent of 3,500 yards are now cut; this will prevent any further damage in this connection for some time. There has also been some extensive draining done on the vlei land, which is to be used for experimental plots; and, in addition, experiments are being carried out in subsoiling, partly with a view to reducing wash. The benefit from subsoiling for this purpose has already been very marked, though I will report more fully on this later on in the season. The temperature has been comparatively uniform throughout, the maximum record being 95° F., while the minimum was 32° F., registered on the vlei in September. We have fortunately escaped hailstorms so far, but hot, north winds have been prevalent of late.

On the 25th September potatoes were planted on the Manure and Distance of Planting sections, in all comprising 76 plots, the variety being Up-to-date; marked results from the various treatments were in evidence on the foliage, particularly so in the case of phosphate manuring, and I have no doubt the results when harvested will be interesting and educative.

Algerian and Indian oats were planted on 40 different plots on the 27th September. The former variety has made a splendid growth, and promises so far to be the best crop of forage yet grown on the Farm; it will not be in condition for harvesting for some time, while the Indian variety, which was planted on the same date, is now being harvested. It appears to produce a fair body of grain, but a scanty return of straw.

Tabulated results of the actual yields will be furnished at a later date.

Two varieties of rye, viz., Rye of the Abruzzes and Rye of Naples, were planted on the 1st October. The former variety will be ripe in about a fortnight, and is one that gives every promise of being worthy of a more extended trial, as it gives every indication at present of yield-a good sample of grain providing the weather will be favourable for filling and maturing; the latter variety is not yet in ear. Eight plots of millet (*Frumentaceum giganteum*) planted on the 28th September are showing vigorous growth on the manured plots.

On the Variety Plots, peas, beans, pumpkins and marrow were planted on the 1st October, and 130 varieties of potatoes on the 17th inst.

In the kitchen garden, which has recently been considerably extended, potatoes, cabbage, cauliflower, artichokes, asparagus, rhubarb, peas, beans, leeks, tomatoes, marrow, melons, celery, lettuce, etc., are being grown.

Between the 12th and 24th November five acres of potatoes were planted, the experiments being based upon—

(*a*) Ploughing, subsoiling and surface cultivation.

(*b*) Chemical manuring.
(*c*) Insecticide (Vaporite).
(*d*) Kraal manuring.
(*e*) Spraying.

An area of 29 acres was planted with mealies on the 26th November for experiments on Distance of Planting, the effect of subsoiling, and the introduction of a bean catch crop on surface wash. The varieties used were North American, Boone County and Improved Horse Tooth, planted in alternate rows, with the object of cross-breeding for selection variety. This section has been surface cultivated twice with the anti-clog weeder.

Between the 4th and 12th of December 29 acres were planted with mealies for manure experiments (chemical and kraal), the varieties being Early Leaming, Funk's Yellow Dent, and 90 Day Yellow; also in alternate rows with a view to cross-breeding and for selection varieties. This section has been cultivated twice with the anti-clog weeder.

On the 19th December an area of 14 acres was planted with mealies, variety Early Mastadon, in conjunction with a series of catch crops to be experimented upon at different dates during the season. This section has been surface cultivated once. A fractional part of the work has, therefore, only been done on this portion.

A Cultivation Section, having an area of 11 acres, was planted with mealies (Early Mastadon) on the 24th December, a date beyond which it is needless to plant mealies with a view to obtaining grain, as the crop is then invariably destroyed by frost.

Twenty-five acres of mabele, planted on the 23rd October, have proved a failure, consequently this area will be available for winter crops.

It is to be regretted that the mangold crop could not be attended to an earlier date, but the ground has now been ploughed, subsoiled and manured, and planting will be done in the course of a few days, and, if favoured towards the latter end of the season with a continuance of the weather now prevailing, a satisfactory crop may yet be grown.

The working stock are at present in a healthy condition; the numbers on charge at date are 9 horses (draught and riding), 6 mules and 38 oxen. The Militia Department has very kindly allowed us the use of a few horses for a short period. They will be very useful for light field work, also to the students for riding, as hitherto there have not been the facilities for that purpose to the extent that I should have liked. I would point out that it is necessary to increase our number of work oxen, as I consider they are being overworked. The casualties for the period under review have been—

1 Horse, died of inflammation of the kidneys.
1 Horse, died of Biliary Fever.
1 Mule, having a deformed hoof, was handed over to the Bacteriological Department.

1 Ox, died of tumour on the brain.

A great acquisition to the Farm has been the securing of a flock of 42 Persian sheep from Cape Colony, 30 being pure bred. These arrived on the 10th December; their average live weight, taken on the 29th instant., was 63lbs. The majority is lambs and the rest two to four-tooth.

The construction of a dam for the water supply of the Farm has been completed and the necessary piping laid, as also the carrying of the system into the School of Agriculture, laboratory, kitchen, bathrooms and dairy. The water has also been laid on to six paddocks, thus rendering them of more service than has previously been the case. The blacksmith's time has been mainly occupied on this work, as also in attending to the minor details of the ordinary blacksmithing work of the Farm. He further attends to the shoeing of horses and mules, and working the steam engine when necessary.

Owing to the large amount of carpentry work of an urgent nature to be done, it was found necessary to employ an assistant carpenter for a few weeks. The principal work done has been, pulling down the original implement, seed and manure store on the vlei (wood and iron) and utilising the material for the construction of a laundry for the use of the School of Agriculture and a boiler house for the dairy branch. Fittings were made for the bedrooms, kitchen and laboratory in the School of Agriculture, also a large number of boxes necessary for the sprouting of potatoes, and sheep shelters have been erected. Certain carpentry work at the Winkle Spruit Experimental Station has been attended to by the farm carpenter. Attention has also been given when necessary to the repairs of implements, etc. Both carpenter and blacksmith devote special attention in their respective branches to the tuition of students.

There are now 14 students on the Farm; they have become familiar with the routine of work, and do the actual manual labour, and receive tuition in the field and workshops. I have very much pleasure in reporting on the general satisfactory progress that is being made by them and on their good conduct.

The public interest which is being taken in the Farm is reflected by the increasing number of visitors and letters of enquiry.

ALEXANDER REID,
Farm Manager.

THE COLLEGE.

Report for the period ending 31st December, 1906, from House Master, School of Agriculture, Cedara, to Director of Experimental Stations.

On February 12th I took up my appointment here as House Master, and on April 19th the school was opened. We made a small beginning with three students, but since then we have increased steadily till we now have 14, and I have every reason to hope that we shall have quite 20 by the time the next session begins in January. Portions of two days during the week have been set apart for lectures and demonstrations, with occasional evening lectures. The rest of the time is devoted to practical work in the field and shops. The year is divided into two sessions, from August 1st to December 15th, and from January 15th to June 30th. During the remaining two months there are no lectures or demonstrations; and the students are allowed a fortnight's holiday twice a year; but only half are allowed away at a time, in order that there may be always some here to help with the work of the farm.

A tennis court has been made, and other games will probably follow. There is no fixed time for recreation, but the boys are allowed time off for this according as the work of the farm allows. There is also a Rifle Association on the Farm, of which all the boys are members. A disused open reservoir is now being converted into a swimming bath.

An Anglican and a Presbyterian clergyman each visit the farm once a month and hold services in the school, and on the other Sundays I read the service myself.

The health of the boys has been excellent, and their work and conduct satisfactory.

The lectures and demonstrations are attended by all the boys. Owing to the Native Rebellion and the outbreak of E.C. Fever, a start was not made with the Veterinary Lectures until the end of October; moreover, very few lectures have as yet been given on general agriculture owing to the late Director's resignation and your own recent arrival. Appended is a statement of the lectures and demonstrations attended during the period under review.

For the practical work the students are divided into five groups, and spend a month at a time at each subject:—

1. *Field Work.*—Ploughing, cultivation and preparation and application of manures, seeding, harvesting, etc., in season, and is under the supervision of the Farm Manager and Field Experimenter.

2. *Dairy Work.*—Feeding and management of dairy stock, milking and separating, butter making, etc., and is under the supervision of the Assistant Dairy Expert.

3. *Orchard Work.*—Raising nursery stock, planting, grafting, budding, pruning, etc., and is under the supervision of the Orchardist.

4. *Carpentry.*—In addition to the ordinary shop work, this includes erection of wood and iron buildings, fencing, etc.

5. *Blacksmithing.*—Setting up, handling and repairing of farm implements, farriery, water-fitting and general shop work.

Instruction is given in the last two subjects by the Carpenter and Engineer respectively, under the supervision of the Farm Manager.

(Signed) C. W. HANNAH, M.A.,
House Master.

CURRICULUM.

(April to December, 1906.)

Lecturer.	*Demonstrator.*
FORESTRY.	
Conservator of Forests (once a month)	Forest Officer (once a month).
FRUIT CULTURE.	
Conservator of Forests (once a month)	Orchardist (once a month, and special demonstrations in season).
BOTANY.	
Cons. Forests and Forester (once a month)	Forester (once a month).
HORTICULTURE.	
Cons. Forests and Forester (once a month)	Forester (once a month).
AGRICULTURAL CHEMISTRY.	
Analyst (twice a week)	Analyst (twice a week).
VETERINARY PRACTICE.	
A. Goule, M.R.C.V.S. (fortnightly)	A. Goule, M.R.C.V.S. (fortnightly).
DAIRY WORK	
Dairy Expert	Assistant Dairy Expert.
MENSURATION.	
House Master (fortnightly)	House Master.

During the coming session there will be a more complete system of lectures and demonstrations, comprising, in addition to the above, Principles of Agriculture, Breeding and Management of Stock, Poultry Farming, etc., Entomology and the Destruction of Pests, Farm Surveying and Bookkeeping. A detailed syllabus is now in the course of preparation and will be submitted at an early date.

WEENEN.

Quarterly Report for period ending 31st December, 1906, from Curator, Weenen Experimental Station, to Director of Experimental Stations.

Owing to your recent arrival the work for the present season has been rather rushed. In spite of this, however, the planting operations, as per instructions received from you, are well in hand, and I trust they will all be completed in time.

The grading operations on lower end of station will probably be well in hand by the end of January, so that the crop of winter wheat may be planted. This work should be very useful in demonstrating in a practical manner to the settlers how land should be prepared for handling irrigation waters in the most economical manner.

A very valuable demonstration as to the amount of forage that can be grown on one of the poorest pieces of land in this settlement has lately been shown on this Station. The piece of land selected for growing the crop was 5 acres in extent, on the upper portion of the block. The ground was seeded on 23rd April, 1906, and cut on 22nd October, 1906, and five following days. 85lbs. of good Algerian seed was sown to the acre, and as the ground was perfectly dry irrigation had to be resorted to to germinate the seed, and, as practically no rain fell during growing period, the crop was subsequently irrigated five times. 211lbs. Ordinary Superphosphate per acre was applied, and the yield per acre was 2¼ tons of dry forage. Considering the splendid stand of crop this is a light yield. I consider that this would have been quite three tons but for the fact that the crop was badly damaged by hail prior to cutting, and the greater portion of the forage dried out too much in the field owing to failure of labour at a critical time.

The tobacco seedlings of five different varieties have made good progress, and will shortly be ready for setting out in the field vacated by the forage. This field has been ploughed up and is in splendid tilth for planting.

The plot of ground intended for drainage tests is being prepared for planting, and will be seeded as soon as possible.

The plot of King Edward VII. potatoes for testing manures and different sizes of sets has been planted, and the crop is just appearing above ground. A series of plots of local Early Rose potatoes to test manures of different kinds, planted earlier in the season, have made good growth, and will be ready to dig in three or four weeks' time. The 19 plots of lucerne planted last March and originally employed for Quantity of Water tests, have now been changed into a combined Manure and Cultivation testing field. The manures have not yet been applied, but the cultivation tests (surface cultivation between the rows) has been in operation for some little time, and already results are noticeable. The lucerne during the present season has suffered from the ravages of caterpillars. I think it probable that this pest will disappear shortly, and may not be seen again for several years.

It is proposed to plant the area of 6 acres between the tobacco field and main road with different varieties of millet, and then, with the completion of the planting of the tobacco field, the sowing of all varieties which I am putting on Row C, and the drainage tests, Row F, the block will be fairly filled up, with the exception of Row E, and the portions to be graded and sown with winter wheat.

Mr. J. K. Harding's tender for the construction of proposed flue-curing tobacco barn has been forwarded to you, also some suggestions from Mr. Owen Walters of this settlement in regard to construction of same.

The buildings, stock and implements are in good order and condition, and a number of ornamental trees have been planted about the former, which will, in a year or two, improve the appearance of the place to a considerable extent.

F. McPHERSON, Curator.

WINKEL SPRUIT.

Quarterly Report for period ending 31st December, 1906, from Curator, Winkel Spruit Experimental Farm, to Director of Experimental Stations.

Work on this Farm during the past three months has practically been confined to the clearing of bush land in order to fully carry out your maize and paddock feeding experiments. This extra work has somewhat retarded planting operations, which are now in full swing. Land for a coffee plantation has also been partly cleared, and this work will be resumed when labour is available.

Dealing with the planting as it has been carried out, the first to receive attention were the aloes. Two thousand plants of Furcroea Gigantea and one hundred and sixty of Agave Sisalana were planted, most of which are now making fair headway. Sugar cane as breakwinds was also planted around the cotton and fibre sections to prevent the shifting of the soil, which is of a loose, sandy nature. The position of these sections is very high, and they are consequently greatly exposed to the wind from all quarters.

Tobacco planting was then proceeded with, and this, I am sorry to state, has proved a failure owing to the continuous strong winds prevalent on the Coast at this time of the year. Out of 10,000 plants transplanted only about 10 per cent. survived. This destruction could be prevented in future seasons by very early or late planting, or by the early planting of maize as breakwinds, meteorological returns tending to prove that the months of November, December and January are more subject to strong winds and storms than the two preceding and two following months.

The old Arrowroot (Distance of Planting) Section previously set aside for Havana tobacco has been planted with Boone County maize, which is growing well.

Kraal and chemical manures have been spread and ploughed under on the Potato Section and the seed planted, the work being completed on December 15th. On the same date from 8 to 9.45 p.m. 2·58 inches of rain fell, causing washouts all over the Farm, and resulted in the complete disappearance of the potatoes planted, only three sacks being eventually recovered from the cane, bush and silt, which were replanted.

No. 1 pig paddock has been planted with pea nuts, and sections formerly planted with Dar-es-Salem cotton, lucerne, pea nuts, peas, kidney beans, soy beans and cow peas have all been turned into one section and planted with Boone County maize.

The rainfall for the past six months has been heavy, over 21 inches being recorded. Only ·28 points of this fell in July and August, the balance of 21 inches falling during the latter four months. Weeds are growing profusely, and with my limited supply of labour it is almost impossible to cope with them. Since writing the above, this place was visited with another storm, over 1 inch falling in about an hour. This has washed out the mealies freshly planted on the old cow pea section, besides again washing out the potatoes.

The stock are all in splendid condition, and labour supply plentiful.

W. JOHANSEN,
Manager.

East Coast Fever.

EXPERIENCE OF RHODESIA.

THE following is a letter from the Chief Veterinary Surgeon, Rhodesia, Mr. J. M. Sinclair, F.R.C.V.S., to the Principal Veterinary Surgeon of Natal, Mr. S. B. Woollatt, F.R.C.V.S.:—

Sir,—In reply to your letter of the 18th instant *re* Coast Fever.

When the disease first appeared in Rhodesia I was away at Kimberley on Rinderpest work; afterwards I went Home on long leave, so that I was not in touch with its very rapid spread over a large portion of this territory, and I can only speak with any confidence on its progress since August, 1904, when I came here to act for Mr. Gray when he went on leave, succeeding him in March, 1905, when he went to the Transvaal.

The approximate mortality to date is as follows:—

Year ending 31st March, 1902	12,761
Year ending 31st March, 1903	16,270
Year ending 31st March, 1904	3,530
Year ending 31st March, 1905	361
Year ending 31st March, 1906	732
1st April to 31st October, 1906	191
Total	33,845

The number given for year ending March, 1905, represents a period of eight months only; the records for the other four are not available.

I attach schedule showing monthly mortality since September, 1904.

I do not think that anyone will deny that the rapid spread of the disease during the years 1902-03 was due chiefly to transport oxen. The disease went right through the country by the main transport road, Umtali to Salisbury, Salisbury to Bulawayo, and from this trunk line to various centres on either side. The greatest losses occurred amongst transport oxen and on farms adjoining infected roads and the large infected centres of distribution, viz., Umtali, Salisbury, Gwelo and Bulawayo.

It will be seen from the table above given that the disease showed a marked decline during the year 1904, due, in my opinion, to the fact that most of the transport oxen had succumbed. In fact, at this time there were practically none but salted cattle on the infected roads. The disease was, however, lingering and spreading slowly in the various infected districts; these will be seen on the attached schedule. Towards the end of 1904 general regulations were promulgated prohibiting as far as possible all movement of cattle. Practically no movement was allowed except for slaughter purposes, and for mining purposes within a radius of 10 miles of mines. In the eastern part of Mashonaland we had to allow a limited amount of transport for supplies to places difficult of access, such as Melsetter and Inyanga. Although the disease was not spreading to any great extent at the time these regulations were promulgated, I am certain they have been very largely responsible for preventing the spread of infection to clean areas during the last two years. As a matter of fact, during this period we have not had more than half-a-dozen outbreaks on previously clean veld.

After these regulations had been in force for some time it was found that infection was being kept alive by calves, and provision was made for the enclosure of all calves on infected farms and other centres, such as commonages. This proved of the greatest benefit, and during the last two years large numbers of calves have been reared in Umtali and Salisbury by dairy men. When these were weaned they were removed by wagon to clean veld, with the result that the Salisbury and Umtali Commonages are now perfectly clean. Various farms have been cleansed by the same method. Of course, on these infected centres all the adult cattle were salted, and no raw cattle were allowed to be brought to them until at least twelve months from the last case of disease. The adoption of this system has resulted in the eradication of the disease in many centres where infection had been lingering for two and three years.

Your information that in certain districts all the cattle died except those belonging to farmers who were able to fence is correct to a very limited extent. When I tell you that to-day there are not ten farms in Rhodesia entirely fenced you will understand that the number of cattle saved by this means cannot be very large. The best object lesson we had as to the beneficial results of fencing was at the Springs farm, Bulawayo. The owner, Col. Napier, fenced early, and although the disease broke out all around him he never lost a single beast from Coast Fever. A few others were able to save their cattle by fencing, notably, the Matabele Reefs and Estates Coy. and the Central Estates Coy., both very large cattle-owners. Had fencing been generally resorted to as a preventive measure in the early days of the disease, I am positive that scores of farmers who suffered very heavily would never have lost a beast.

Possibly some reference may be intended to two areas fenced in Matabeleland for the purpose of dealing with infected cattle. At Mzingwane native cattle had been dying at various kraals for upwards of two years. We fenced in about ten thousand acres of clean veld, several miles away from the infected area, and removed all the cattle from the infected area to the fenced-in area. The system first practised by you was adopted in the removal of these cattle, and since their removal not a single case of Coast Fever has occurred amongst them. The second fence was erected at the Fingoe Location. For various reasons it was impossible to remove these cattle to clean veld, so we fenced in the whole of the infected area. The disease gradually died out, assisted by moving the cattle from place to place within the area, and it is now more than eighteen months since a death from Coast Fever has occurred at this centre. In this case our object in fencing was not to save the Fingoe cattle, but to prevent the disease spreading to adjacent herds, and we acomplished our object.

We have satisfactorily dealt with various lots of infected cattle by removing them to clean veld without fencing, every care being taken to prevent cattle getting on to the infected area until we are satisfied that it is clean, and we hope by dealing with any fresh outbreak on these lines to eventually eradicate the disease from the whole territory. You will understand that we have excellent facilities for carrying out a measure like this. I refer to the large clean areas we have on which there are at present very few cattle.

With regard to dipping. When the disease was spreading through this country tanks were erected at various centres along the transport routes, but most of these have been lying idle since the movement of cattle was prohibited. At Umtali, Salisbury and Bulawayo the tanks have been kept going for the purpose of dipping commonage and slaughter cattle. Few farmers have been able to erect tanks. A few did when the disease appeared amongst their cattle, but I do not think the fortnightly immersion practised resulted in any appreciable diminution of the ultimate mortality. Dipping would undoubtedly prove a most excellent preventive measure if universally practised in any district or province, but when once the disease appears there is, in my opinion, only one thing to do, viz., remove the cattle to clean veld.

I shall be very pleased to give you any further information in my power.—Yours faithfully,

J. M. SINCLAIR.

Salisbury, 26th November, 1906.

It is not generally known that anyone attending to bees may escape many stings by first thoroughly washing their hands, then rubbing them all over with a little pure beeswax. This prevents any odour from the hands being noticed by the bees. The scent from beeswax attracts a bee's attention very strongly, and seems to deprive it of any exhibition of hostility or bad temper.

Marvellous Poultry.

The following is extracted from a Chicago newspaper:—

Elkton, Md., Oct. 20.—In a poultry yard near here is a hen that is considered to be a freak. She can play the piano.

It all happened when the hen flew into the parlour of the farmhouse and landed on the ivory keys of the instrument which, of course, gave forth a few discordant notes. At first the chicken was greatly astonished, but in a little while she grew accustomed to the sounds and liked the effect.

It then became a common thing for the hen to perch on the window while the daughter of the house was taking her lessons and intently listen to the music. By and by the fowl tried a few notes herself, and finally, to the surprise of all, she ran the scale.

That settled it. The hen, called Bache, started out on an artistic career, and to say that she has succeeded puts it mildly. She is really wonderful.

In the heavier compositions she is a failure, but in the lighter works, and especially in sprightly airs, she surpasses. Her range, of course, must be limited by the width of her claws, but even this handicap is partly overcome by the clever use of her wings in jumping from one octave to another.

Wildwood, N. J., Oct. 20.—It is a pity the lightning bug season is at an end, for sceptical persons will not be able to verify the truth of John Shaeffer's statement that by feeding hens lightning bugs you can induce them to lay illuminated eggs.

Mr. Shaeffer, during the height of the lightning bug season, gave two hens nothing else to eat, and he declares that each day he got two eggs of sixteen-candle-power strength.

By varnishing the eggs he has preserved their strength, and he believes the longer these glowing eggs are kept the stronger they will grow.

By painting them red, blue or green he found that he could get as many different coloured lights, and most beautiful effects could be got by stringing them in festoons.

He thinks that if lightning bugs are fed to ostriches lights large enough for automobile lamps can be had.

Fullerton, Mo., Oct. 20.—The craziest rooster in all Missouri is owned by Walter Lynne, residing near here. It is acting as if it were an automobile and is creating havoc among the flock.

This rooster no longer crows at dawn, but by assiduous association with a few geese it has acquired a lovely "honk, honk," and practices this on all occasions.

At times it starts at one end of the barn-yard and, giving a warning alarm, rushes through the rest of the chickens, bowling them over right and left.

A few days ago Mrs. Lynne left a can of kerosene on the back porch, and within ten minutes the rooster was doing its best to drink up the stuff, undoubtedly with the object of acquiring the gasoline smell.

It is also developing an "auto face."

Salem, Va., Oct. 20.—Much sympathy is expressed for Aunt Mary Fitzpatrick, whose entire flock of chickens has been tampered with by some unfeeling wretch to the end that they are laying poached eggs.

It is almost certain that for months the chickens have been fed on cayenne pepper and tabasco sauce, which sizzles the internal department of the chickens.

So great is this heat that the feathers on the fowls are quite scorched at the ends and the skin appears parboiled.

As this flock was almost the sole support of Mrs. Fitzpatrick, kind neighbours have been buying the eggs from her. But even a steady diet of this sort palls in time, and the inhabitants are praying for cold weather, when it is thought the temperature of the hens will be reduced.

A Cattle Show of Old.

It was, says the *Globe,* London, in one of its "turnover" articles, on the morning of the memorable 13th of May, 1827, that Mr. Pickwick, taking a comprehensive view of the locality from his bedroom window, found "Goswell-street at his feet, Goswell-street on his right hand, Goswell-street extending on his left, and the opposite side of Goswell-street over the way." We are not told whether this extensive panorama included the premises honourably known as "Sadler's Yard, Goswell-street"; but here, a hundred years ago, was held the show of the Smithfield Club. That this was on a much humbler scale than that which has long been a popular event both for town and country is necessarily implied by the site selected. But the limited character of the show is brought home to us more fully by the fact that the proprietor of Sadler's Yard paid 50 guineas to the club, for which modest sum he was to provision all the animals exhibited, and to receive in turn all the money paid for admission. It is not, however, in mere point of extent that the shows divided by a hundred years are so strikingly different. It was in 1806 that the first dahlia was exhibited in England, and the variations between that single-rayed flower and the present pompous representatives of the family are hardly greater than those shown by British cattle in the same period. At the beginning of the last century old views and old methods of breeding, rearing, and feeding still widely prevailed. The farmers of the West of England loved "a snug tight bullock, with a stout frame of bone to build flesh and fat upon, and a good thick hide to keep out the cold and wet"; but the main consideration was that such animals "cost little or nothing in keep." With the result, that some of our beef was often fairly describable as "black and coarse-grained as horse-flesh."

All cattle shows are presumably held to demonstrate the force of the proposition that the proof of the ox is in the eating; and from this point of view the "lead" long given by the Smithfield Club has worked wonders. There is beef—and beef in our own day; but the difference between the English beef of even a century ago and the pick of our present markets would certainly astonish the valiant diners at either end of that historic vista. Too many of the cattle of the former period were leggy, throaty, large-boned, and coarse, though the "square, beefy Dutchman" had already been imported to become the basis of our future shorthorns. But it was not until 1803 that such an advance was shown in this breed as to warrant the Club in awarding a prize to the "best shorthorn"; a class which, to-day, is perhaps the most numerous and popular in the kingdom. Even the names of most of the old breeds once in vogue are now forgotten; but their defects were so palpable that they might have been—as some doubtless were—the lineal descendants of the animals of the Middle Ages. The old Lincolnshire cattle were coarse, and "stilty," while the Glamorganshires were what was then known as "cloddy." The Holderness breed were perhaps the worst-shaped cattle in this island; "long, gaunt, deep carcases, without adequate substance; standing upon high stilts of the coarest timber; slow feeders, never fat, and the flesh excessively coarse." Even the once favoured Pembroke ox was too leggy, but he matured early, and inherited the then especially valuable quality of being able to "stand his drift." By which West-country phrase was meant the ability to make long journeys without too much exhaustion, a point in the old economy of cattle raising—and especially of cattle "showing"—which no one concerned in the industry could afford to disregard. For a herd had often to travel scores and, occasionally, hundreds of miles, so that "constitution" was an essential factor in the animals upon which the country then depended for its roast beef. Scott speaks of the cattle which the Highland drovers used to conduct from far Lochabar to Lincolnshire, a feat which perhaps only those chiefs among herdsmen could have accomplished. It was to this necessity of travel that the old complaint of "legginess" was perhaps mainly due; the breeder not feeling free to cultivate size and shapeliness, without reference to the strength of leg and bodily constitution necessary in an animal in which these qualities were so often tested.

But most differences tend ultimately towards compromise. If our ancient beeves had to "stand their drift," we are yet assured that a not too fatiguing journey improved the quality of their meat. The reason given is, that a fair amount of travel on foot causes the fat to incorporate more intimately with the lean, and the muscle itself to become more tender. "Such meat acquired a softer, marrow-like consistency, and was doubtless more digestible than the robust, hard fibred flesh which reaches town, without the slightest exertion, by rail." This may be looked at either as a counsel of perfection, or as a carping criticism, according to the point of view. Of course, an immense advance in the character of our cattle had been made even before the inauguration of railways; but it has also been going on ever since; and a stalled ox of even half-a-century ago would probably make a poor appearance by the side of one of our latest prize-winners. The latter may sometimes strike us as unwieldy, and perhaps overfed, while their vast bulk is not without a touch of the pathetic. And, of course, they are groomed and attended as becomes their dignity, and the weighty issues depending. In a word, they have been sedulously brought to that high state and condition which is commonly spoken of the "pink of perfection." As compared with such an exhibition as this, the cattle gatherings of old—whether at show, fair, or market—must have presented a meagre and bedraggled appearance. But like its modern counterpart, the old show necessarily represented the conditions of country and agricultural life which then obtained. And this practically means the before, and after, of the railway system. The one signified the drover, and the drover's dog, and vast herds of weary, hoof-sore cattle, limping painfully onward from one centre to another. The other involves more complex considerations; but on the whole, the philosopher at the cattle show may contemplate with satisfaction the great strides already made in the interminable march of improvement; and dismiss without regret the good old times when any such gathering was always a rough, and sometimes a painful, exhibition.

Co-Operation.

EXTRACT FROM MR. CHAMBERLAIN'S TARIFF COMMISSION, VOLUME 3, REPORT OF THE AGRICULTURAL COMMITTEE.

The evidence received in regard to co-operation and market organisation indicates how little has been done in the way of serious and systematic co-operative organisation in Great Britain, though in Ireland, as shown in the evidence of the Secretary of the Irish Agricultural Organisation Society, the process has been marked. It would seem that, where agricultural co-operation has been a success in Great Britain, it has been chiefly in the purchase of farmers' supplies, and witnesses from Wiltshire, Somerset, Leicestershire, Cheshire, Staffordshire, Lancashire and other countries suggest the large field there is for its existence. In Worcestershire and Staffordshire witnesses say they gain 10 per cent. to 15 per cent. by the co-operative buying of their implements, seeds, manures and feeding stuffs, and the benefits arising from the operations of the West Norfolk Manure Co. are specially referred to in the evidence from the Eastern countries. Reference is also made in the evidence to other co-operative and farmers' supply associations which enable farmers to obtain manures, feeding stuffs and implements on more advantageous terms than would otherwise be secured, but outside Ireland there is little evidence of the systematic adoption of co-operative principles as understood in countries which are our chief competitors in agricultural produce.

The evidence of the Irish Agricultural Organisation Society shows that in co-operative creameries there is a membership of nearly 100,000 people, mostly heads of families, so that half a million of persons in Ireland may be said to be directly interested in this branch of co-operation alone. So indispensable is co-operation deemed by this Society (which itself has been so largely instrumental in promoting the co-operative movement in Ireland on its present lines) that the Secretary states it as his opinion that without it the Land Purchase Act cannot be permanently successful. He says:—"It is very little use for the State to put people in possession of the land and to change their annual rental to an annuity, even if that annuity is considerably less than the amount of the rent which they used to pay, unless they at the same time place these people in a position to buy the raw materials for the industry at bedrock prices and to sell their produce to the greatest advantage. If that is not done, the mere creation of a peasant proprietary among these small men may prove to be something else than an unmixed blessing. Without co-operation among these small men the peasant proprietor in a few years will be in as bad a plight as when he was a tenant farmer." Creamery dairying is on the increase in Ireland, as it pays better than the ordinary system of dairying on non-co-operative lines under which each farmer makes his own butter and has to find a market for it. The approximate value of the annual output of the co-operative creameries in connection with the Irish Agricultural Organisation Society is stated to amount already to between £1,500,000 and £2,000,000. "We are now," observes the Secretary of the Association, "gradually coming to the point where we can apply co-operative methods to practically every branch of the agricultural industry, and with great success in particular to the marketing for agricultural produce. We have solved the problem in butter, we are solving it in eggs, but when you come to deal with grain, for instance, the sale of barley to either malsters, the brewers, or distillers, you find that a very difficult matter." The evidence shows the improvement in the quality of the butter which has resulted from the action of the creameries, to which the farmer simply delivers the fresh milk, taking away the separated. Nor are the advantages confined to quality only, for whereas under the old system 3 gallons of average milk yielded 1lb. of butter, now the average is 1lb. of butter from 2 1-3rd gallons. The butter is made and sold at the creameries at a cost of about 7s. a cwt. Creameries have been established either in connection with the Irish Agricultural Organisation Society or independently, in all parts of Ireland, as shown by the reports of witnesses in Cork, Tipperary, Kilkenny, Donegal, Antrim, Londonderry, etc. Agricultural co-operation in general has been more extensively adopted in the South of Ireland than in the North.

But though systematic co-operation for the sale of produce, as well as the purchase of farmers' requisites, has been so little adopted in the United Kingdom outside Ireland, the evidence shows how many districts there are in the various parts of the country in which farmers realise the need of the adoption of methods which are proving so successful in Ireland and other agricultural countries. One difficulty which is again mentioned in the evidence as standing in the way of the extension of co-operative buying is the want of ready money on the part of the farmers. A Wiltshire witness says:—"We carried on for 15 years a co-operative business, turning over from £30,000 to £40,000 a year, but, owing to farmers being so short of money, it fell through," and similar evidence is given by other witnesses. Other evidence as to the failure of co-operation may be classified under three heads:—(1) Bare statements of the fact that co-operation in a certain district has been tried and had failed.

This evidence comes from districts as far apart as Lincolnshire, Northamptonshire, Londonderry, Galway and Lanark. (2) The evidence of witnesses which lay the blame of failure on bad management. (3) The evidence, also from widely separated districts, of witnesses who attribute failure to the difficulty of getting farmers to combine. One witness says:—"The Society failed from want of support from the farmers." Another:—"As to co-operation amongst farmers in my district in buying and selling, you cannot get them to, I am sorry to say." A third witness says:—"The farmers in my neighbourhood will never unite." A Bedfordshire farmer says:—"The Board of Agriculture have been trying to get some 20 of the gardeners on one of the small estates to amalgamate and send their produce to London together, but have given it up in disgust; the men did not appreciate their efforts."

Some English witnesses assert that while co-operation may be beneficial for small farmers the large farmer buys and sells in sufficiently large quantities to be able to get equally good terms as would be granted to any co-operative body. The evidence indeed shows that in the opinion of witnesses the advantage of co-operation is specially marked in the case of small holdings. The Irish Agricultural Organisation Society, for instance, is confident that "when small farmers learnt the advantage of co-operating, they would very soon join, and then by means of their societies the Association would be able to get reforms carried out more quickly. Out of some 500,000 farmers in Ireland, we have 200,000 who live on holdings of between 1 and 15 acres. But it is to these very small men whom you would hardly dignify by the title of farmers that our co-operative work has been so beneficial. It is only by association with his neighbours that the small holder can possibly hope to get for his produce on the market anything like a reasonable price."

The evidence indicates the benefit derived from co-operation in competing foreign countries. The co-operative system of Holland, for instance, enables Dutch farmers to make butter of a uniform quality and put it on the market to more advantage than can the English farmer. In France, co-operative marketing by small holders, and particularly the small fruit-growers, is largely practised. "French vegetables and fruit," before coming here, are graded by the dealer, so that on leaving his hands, it is no longer the mixed produce of A, B and C, but uniform, and the individual fruit grower's interest in the produce is absolutely lost." This method, however, can only be carried out when small growers sell their crops outright to the dealers on the spot. Several witnesses extol the Danish system of co-operation as regards meat and dairy produce, and, referring to attempts which have been made to establish large co-operative bacon-curing factories on the lines of those in Denmark, it is pointed out that, so long as we keep to our present system, we cannot hope to compete with the foreign farmer. Other evidence shows that Danish farmers keep a larger stock of cows and pigs per acre than any other country and that the pigs are turned into bacon at the least possible cost, as the farmers have their own dairies and slaughterhouses in every district within easy reach of the farm, thus lessening cost and promoting uniformity of quality.

Insects of German East Africa.

By H. v. P. Berensberg, Office of the Government Entomologist.

Notwithstanding the fact that Natal belongs to another zoo-geographical region than the above-named, it seems to me in reading through the "Reports of the Entomologist of the Kaiserl. Biologische Landwirth schaftliche Institut at Amani, G.E.A.," that they have in that country many of the pests common to Natal. Therefore it may be interesting for the readers of this *Journal* to become acquainted with some of them, the more as they, not being known yet as pests here, may become so when certain plants are cultivated.

The Plague-locust—which is not the same as in Natal—does as much damage as, if not more, than our Red-locust. A small green or sometimes greyish insect belonging to the same family and named *Concephalus nitidulus Scop.* often destroys the whole rice crop, eating the ears and damaging them in such a way that it does not even pay the cost of labour to reap the rice afterwards. *Zonocerus elegans Thunb,* the totofiana of Natal, seems to do much damage to plantations of coffee, cotton and castor-oil plants, and to cultivation generally. The gardeners in Natal know what a troublesome insect this is and how difficult it is to safeguard their young as well as their older plants against this disagreeable pest. Hand-picking in the early morning, when the insects are still sluggish and can easily be gathered in a bucket of water on the top of which a thin layer of paraffin is spread, is recommended as the only efficient remedy to get rid of them. Birds and predacious insects will not attack them, because when touched they eject from the back a nauseous yellow liquid, which is said to cause inflammation on the mucous membrane of sensitive collectors.

Chrotogonus hemipterus Schaum., another locustid, is a small species, earth-coloured, and therefore difficult to detect. It also does a great deal of damage to young vegetables and seedlings. Fowls, which were allowed to run free in the gardens, kept this pest down to a reasonable limit. This hopper is also found in Natal and is well known to amateur gardeners.

The cotton plant is the host of many insects, some of which are great pests and often destroy whole crops. A caterpillar of a small moth—a species of *Gelechia*—attacks the cotton-bolls, destroys the seeds and probably pupates inside them. As a remedy the bolls were exposed on corrugated iron sheets to the sun which killed the worms. Experiments with lamps to attract the moths at night time gave unsatisfactory results. Furthermore, in passing the cotton through the ginning-machine, great numbers of caterpillars were destroyed or injured, so that they died afterwards; but such as were inside the seeds escaped uninjured, which indicates that the pest can be carried in the seed.

Another small moth, a *Pyralid*, cuts the cotton leaves from two sides and rolls them then together, fixing them with a few silk stitches. This moth was identified as the cotton-leaf roller, known scientifically as *Sylepta multilinealis Guen.* The damage done is not of so much importance, as the insect never attacks the flowers or the bolls, but restricts its work to the leaves, which dry up and then hang down vertically, giving the plant a rather sickly appearance. When the caterpillars have pupated in these same rolls the plant will soon recover, and no great damage results. July was the prinicpal month in which they occurred. Squeezing the caterpillars and the pupae in their shelters is given as a remedy.

In the Durban Museum collection of moths a few specimens of this Pyralid are present, labelled "caught in Natal at lamp-light." Thus, there may be some probability of it becoming a pest in the cotton-growing districts. Mr. John Kirkman observed last year in his cotton fields at Esperanza a dirty-greenish caterpillar, which disfigured the cotton leaves in a similar manner, attacking the plants in March. The moth, which was reared from caterpillars, is a yellowish creature with brown, dark mottled bases of the forewing and a golden sheen over wings and body, and named *Polygrammodes sabelialis Guer.* The leaves which accompanied the caterpillars as a supply of food showed mines made by some small leaf miner, and ultimately a very tiny moth emerged from them.

The caterpillar of the vine-hawkmoth (*Chaerocampa celerio Linn.*) and another of an emperor-moth (*Saturnid*) destroyed a whole plantation of cotton near Dar-es-salam. Both these genera being represented by many species in Natal, it will be advisable to look out for their appearance in cotton fields.

Hawkmoths' larvae are easily recognisable by the long horn on the last segment, and saturnid caterpillars by rows of bristly spines all over the body. Hand-picking is the recommended remedy.

The tops of the young shoots of the cotton plant are attacked by *Earias insulana Boisd.* (of the Family *Noctuidae* and Sub-family *Noctuinae*), the larva of which bores into them and causes them to wilt and die. The moth is very variable, light green forewings and white hindwings, forewings often with a brownish band. In Egypt this moth is considered the worst pest of the cotton plant. In Natal it comes frequently to the light, and its caterpillars feed on the seed bolls of *Hybiscus.* There are some more representatives of the same genus in Natal, and it is very probable that the moth will take to cotton if opportunity offers itself.

The Red Bollworm (*Gelechia gossypiella Saund.*) does injury also to the cotton-bolls. As yet I am not aware of its presence in Natal.

Picking and burning the bolls is given as the only successful remedy.

Of the bug family, or *Hemiptera*, mention is made of a red-bug (*Dysdercus*), a handsome insect, which occurs also in Natal, then of *Oxycarenus hyalinipennis Costa* as a doubtfully injurious insect, and of *Callidea rufopicta Wlk.* and of *Dysdercus superstitiosus F.*, from Tabora. The latter bug has been caught at Malvern, Natal.

Jassidae (leaf-hoppers), which are also found plentiful on other forms of cultivation, do not appear to do much damage. A small green cicada abundant on cotton and castor-oil plants in German East Africa is probably the same as the one which was reported from Stanger Experimental Farm as doing harm to cotton; but, on closer inspection, it appeared that other influences were responsible for the harm done. The same cicada was also present in the cotton fields at Esperanza and Umzinto. Being a native of this country and being found plentifully in grasses and wild growths, it is easy to understand that they abound in cotton fields surrounded by grass, especially near water.

Snout-beetles (*Cucullionidae*), leaf-eating beetles (*Chrysomelidae* and *Halticidae*), and two species of leaf-eating ladybirds (*Epilachna*) were found to do little damage to the foliage.

All these beetles are represented by allied species in Natal. Two further insects of the same order are mentioned as injuring the cotton seeds; these are *Tenebroides mauritanicus Linn.* and *Tribolium confusum Duv.* Cotton seed is also attacked by a tiny moth of the family *Tineidae*; the injuries are very important, as they appeared by thousands in the stored seed bags. Submerging the bags for twenty-four hours in salt water has proved successful. Quick drying afterwards is essential to prevent the immediate germination of the seed. The thin layer of salt on the seeds seems to preserve them from further attacks of the insect. Aphis and mites (the latter deforming the tops in a similar way as the former), termites and millepedes, damaging young and half-grown plants, are reported. Against the mites a mixture of flowers of sulphur and powder of lime is employed.

Among fungus diseases is mentioned as occurring at Kilwa and Mkondaji one called by Dr. Vossler "Brown-stem," which was thought first to be caused by insects, but of which no evidence was found. Another, "Red spots on leaves," is more peculiar to the Coast districts. The diseased leaves die and fall off at first, but the plants recover later on and the crops are satisfactory. From Umzinto and Esperanza the same or very similar diseases were reported last year, which caused much anxiety in the beginning, but proved to be of no fatal consequences.

The palm is attacked by a snout-beetle, the palm-borer (*Rhynchophoros phoenicis*) and by the rhinoceros-beetle (*Oryctes boas Fabr.*) In German East Africa the last one is said to deposit its eggs on the apex of the palm, from where the hatched larva bores into the heart of the palm. Repeated attacks of one or more beetles will kill the plant in a short time. The presence of the beetle in the palm is discovered by the appearance of the leaf, which looks as if punched. This beetle is very common in Natal and breeds in manure-heaps. The adult beetle has been found boring into the apex of the phoenix palm and feeding on the juices, but the larva of it has never been detected inside.

Tetralobus flabellicornis, the giant click-beetle, is also reported to attack palms. Nothing of this kind is as yet known of it in Natal, where it occurs in great numbers.

The coffee plant is attacked by several insects, the worst of which is the coffee-bug (*Anthestia variegatus Thunb. var. lineaticollis Stal.*) Losses suffered by this pest in two plantations alone amounted to £2,000 and £750 respectively. The entire losses in all plantations will amount to more than £5,000 (100,000 marks). *Anthestia variegatus Thunb.,* the coffee-bug, is responsible for much damage to coffee in Rhodesia, and also occurs in Natal. The next important pest is a longicorn beetle, the well known coffee-borer (*Anthores leuconotus Pasc.*), the larva of which lives in the interior of the stem. One German planter had recourse to cutting out the larvae. With the help of a specially trained staff of natives, he was able to remove from 10,000 to 20,000 larvae per week. The wounds caused by the extraction of the grubs healed very soon, and there was no ill effect on the trees. If the affected plants have to be removed, it is important to burn them, because it has been proved that the larva is able to live in the dry wood for months and for years and to develop the adult beetle. The failure of the coffee-growing here in Natal has been ascribed for the greater part to this pest.

The Ricinus, or castor-oil plant, suffers from the larva of an imperor moth (*Nudaurelia Wahlbergi Boisd.*) This beautiful yellow moth is plentiful in Natal, and its larva feeds principally on the same plant. The damage done is not recorded because the plant is not cultivated commercially.

A borer moth, probably *Duomitus capensis,* has been found to destroy the older trees (the younger plants are not attacked, the larva needing the woody inside as food to its devolment). This same moth feeds on the same food-plant in Natal.

The larva of a butterfly, *Eurytela dryope Cram.,* feeds on Ricinus in Natal. Very small bugs (*Capsidae*), a slender yellowish bug (not specified) and several species of *Chrysomelidae,* leaf-eating ladybirds (*Epilachna sp.*) and snout-beetles do little damage. The Oleander hawkmoth (*Daphnis nerii*) is said to injure the Chinchona tree; here in Natal it lives on the Oleander, but its damage amounts to nothing. Hand-picking is recommended as a remedy. Bugs of the genera *Disphinctus, Aniscocelis, Cimea Capsidae* and *Lygae,* and the beetles *Lycus trabeatus Guer.* and *Lycus cuspidatus Kr.* are reported as enemies of the Chinchona. Representatives of all these insects are found in Natal. *Lycus* is very plentiful, but has not yet shown an inclination to attack cultivated plants.

Imported Eucalyptus trees have suffered under the attack of a bug (*Disphinctus?*). The larvae of a *Melolonthid* beetle killed an older Eucalyptus tree, being found in hundreds on the roots and destroying them. Cutworms are said to attack vegetables and grasses just as here. The diamond back moth (*Plutella cruciferarum Zell.*) does much damage to cauliflowers, turnips and others. It is sufficiently known in Natal.

Flowers are attacked by a host of insects. *Glotulla pankratii Cyr.* attacks lilies; its caterpillar begins to eat the leaves, and then enters the bulbs, which it destroys completely. Here in Natal two species of the genus *Diaphone* and well known *Diaph. eumela Holl.*, a black caterpillar with white spots, and *Diaphone dominica Cram.*, caterpillar reddish-brown with white or yellowish bands and spots, attack all plants belonging to the family *Liliacae.*

The orange butterfly (*Papilio demoleus Linn.*), our most common butterfly, which feeds here in Natal on young orange and lemon trees, has taken to the same food in German East Africa.

A kind of mealy bug (*Dactylopius*) is found on the roots of asparagus, horseradish and turnips. A melon fly (probably *Dacus ferrugineus F.*) causes the fruit of cucumbers and allied plants to decay just as in Natal. *Peronospera cubensis B and C*, a fungus disease, is common to the *Cucurbitae.* Flowering roses, carnations, cannas and others are disfigured and destroyed by a blister-beetle (*Mylabris bihumerosa Mass.*) Its cousin, *Mylabris transversalis Mass.*, is very destructive to flowering beans, roses, and a host of other flowers in the Garden Colony.

Flies are mentioned as disease-carriers; several Tsetse-flies occur, such as *Glossina morsitans Westw.*, *Glossina fusca Wlk.*, *Glossina pallidipes Aust.* *Morsitans* and *pallidipes* are reported from Bukobo, and *fusca* from Mayumba, and the latter one is suspected as the conveyor of the germs of the so dreaded and still uncurable "sleeping-sickness," because this disease occurs at Mayumba, and *Glossina palpalis* has not yet been found there. The genus *Tabanidae* (horse-flies) is represented by *Pangonia varycolor Wied.* and *Hippobosca francilloni Leach.* The genus *Stomoxys*, a fly much alike the house-fly but biting, exists in great numbers, and is identical with the stable fly of Natal. Mosquitoes, both *Anopheles* and *Culicidae*, are richly represented. Ticks are mentioned on calves and cattle from Zanzibar, Dar-es-salam and Ujiji.

A special tick as the propagator of the Recurrent-fever is reported from the Karawan-shelters at Masoudi.

Tsetse flies occur in the northern part of Zululand, Tabanidae everywhere in Natal. Mosquitoes and ticks are sufficiently known by everyone as not to merit special mention.

There is no mention made of scale-insects in the Report of the Entomologist of German East Africa, but there is no doubt about their presence in that Colony, myself having found them plentifully round

Dar-es-salam at my last visit to that place four years ago. Being then not especially interested in these insects, I did not take any notes as to species and food-plant. From the report it is evident that there are many insect pests which also occur in Natal, but which have not become pests here. They may become so when conditions are more favourable for their development.

Turkeys, Their Care and Management.

Mr. H. V. Hawkins, Poultry Expert, in the *Victoria Journal of Agriculture,* writes:—In response to inquiries for hints on the management of turkeys, and the cause of many fertile eggs not hatching, I intend to briefly outline a few points of primary importance in connection with their habits, etc.

In the first place, the Turks had little, if anything, to do with this breed, so that the name "Turkey" was not given this excellent table bird by them, but rather by the Americans. Personally, I am inclined to the belief that the Mexicans discovered the wild turkey, but the credit of vastly improving and domesticating it, and raising the breed to the present standard of perfection rightly belong to the Americans. In any case, I am content to know that the Americans have farmed turkeys for so many years, and have wonderfully changed their type, colour, and habits, with such splendid results.

The question so often asked is, "Why turkey farming has been so long neglected here?" Those who have done most for the Commonwealth in this regard have been the squatters, who, in many cases, merely keep a few at first to supply a change of menu for mutton. They have little time to devote to the care of these birds, still, in most cases, the result has been great success. The reason is not difficult to find, *i.e.,* turkeys, being great travellers and foragers, must have acres. They may be seen in large flocks in the Riverina miles from the station homestead. They have a decided objection to being fed on wheat morning and evening. I have taken particular notice of their method of feeding, and have invariably found that they had good appetites when variety of food abounded, *i.e.,* first a seed, then an insect; possibly a grasshopper would cross their track, and a bad time the grasshoppers get when a flock of 200 bronze turkeys sets sail.

BEST BREEDS TO FARM.

The bronze turkey being large, and the flesh so beautifully white and succulent, is perhaps the breed *par excellence,* yet it should be always borne in mind that the 40lbs. gobbler is not the most profitable to breed. Birds of 14 to 18lbs. weight are usually those which the consumer prefers, provided sufficient flesh is presented to the chef by which he can satisfy a fairly large number of visitors. The black turkey gobbler of good size, and two years at least, and unrelated, and twelve to thirteen large bronze hens (two years old), make an ideal breeding flock. Many add a very large bronze gobbler, which is unsuitable for the hens, non-fertilisation of the eggs being the result. Each hen averages eighteen to twenty eggs before going broody.

Turkeys need little attention if kept away from fowls and ducks. Turkey farming pays best by itself, and the northern areas are more suitable than the southern. They lay their eggs in a secluded spot; a cement barrel laid on its side with a brick each side to prevent rolling, and a branch of a tree partially covering its entrance, is all they want to encourage them. It is best to permit the eggs to remain in the nest. The hen is usually very cautious on entering and leaving her nest, and seldom breaks an egg, unless she has not had sufficient shell formers in her diet. See that she gets ample cinders, burnt bones, and charcoal, and, when possible, plenty of dry oyster shell. Much depends on the farmer whether she breaks the egg and hatches her young.

MAKING NEST, ETC.

Always provide the hen with an inviting spot and plenty of green grass for the nest; a too dry nest often causes trouble—lack of moisture. In districts in the far north I would strongly urge that one side of the barrel be removed; make the nest on the ground, oval in shape, and keep a fair amount of moisture around the nest. Give the hen opportunity to dust herself in a damp spot; she will get it if possible, and there will be little fear of dead chickens in the shell unless breeding from immature birds is practised. A gobbler at twelve months is not the best. He should be at least two years old; likewise the hens. Above all, introduce fresh blood every second year; this is of great importance in the raising of turkeys for profit. Again, a vigorous gobbler will fertilise all the eggs of a dozen hens in less than four weeks; that is to say, suppose a turkey hen, after she has had the companionship of her mate for say a month, lays seventeen eggs at a stretch, the whole batch laid prior to her brooding will be fertilised. In short, you need only borrow a good gobbler for one month in the season, provided you are not hatching late chicks. See that his toes are not like a razor, otherwise serious results may follow; I have, this season, stitched three beautiful bronze hens, the backs of which had been laid bare.

Of one thing there can be no doubt, turkeys do best in the fresh air, and will not stand coddling; they should be housed in large airy sheds, open completely on the eastern side, with perches fairly wide, (three to four inches). The straighter the breast bone, the better satisfied will the consuming public be, and narrow perches mean crooked breast bones. Do not place the perches too high, especially where the ground is hard or stony, as turkeys are, like fowls, subject to bumble feet, which often spoil hens for a whole season. I am quite convinced that turkeys must be encouraged to accustom themselves to shed roosts; they prefer the limb of a tree or the top of a harvester, but that should not be. A little coaxing for a week, a kindly bucket of oats by way of encouragement, will do much to form the habit of coming home each night at dusk, instead of their straying away, or being found in the field in the morning with their heads off—the work of foxes, which are very troublesome in most districts.

FEEDING TURKEYS.

The adult birds usually find most of their own food, yet it is an absolute necessity to feed the flocks when natural foods are not available, *i.e.*, in the autumn and winter they get down in condition if not attended to, although they may have unlimited range. Insect life is then scarce, grass is of poor quality, and is also usually wet, and the consequence is they scour and often die from the effects. Barley meal, maize meal, and bran (one part each), with a fair amount of chopped up boiled rabbit, and when available a few sliced up raw onions, all mixed with the soup in which the rabbit or other animal food has been boiled, should be used. Mix as dry as possible, turkeys do not thrive on slops. Curded milk is much relished, and is a splendid flesh former, and a whitener of flesh; nothing is more objectionable than a *fatty* breast. Too much maize feeding, or a constant supply of wheat, will not improve the colour of the flesh. Oats are by far the best of the grains to assist in keeping down fat.

Fresh Water.—Always provide fresh clean water daily, and keep the vessel out of the sun; neglect in this regard will cause losses by disease. Add charcoal in case of bowel disorders; it is an absolute necessity in successful turkey raising.

Grit.—They must have an unlimited supply of grit, without which they suffer much from indigestion. Small pebbles, coarse sand, and pieces of broken crockery, and smashed up burnt bone all aid in digesting their food; this is especially required prior to their going to roost.

Boiled Grain.—There is no necessity to boil any grain; they are better without it, and prefer the hard food to that of a sloppy nature.

Egg Producers.—The so-called "egg producers," mentioned by some of my correspondents, would, if fed in sufficient quantities, in some cases assist egg production, but at what a cost? The best egg producer is insect life, and when not available in sufficient quantities, add the best substitute, *i.e.*, beef and mutton scraps, sheep or bullock's liver, or rabbit, soaked in cold water overnight, and then lightly boiled. Use the liquid for mixing the morning meal, and avoid making it pasty, but use the hands well in mixing it hard and friable. Curded milk when available should be a magnificent aid to egg production, and when topping turkeys off for market, give them as much as they will take, as it softens and whitens the flesh; milk fed turkeys eat like six weeks old chickens.

Young Turkeys.—For young turkeys many successful raisers use hard boiled eggs mixed with stale bread crumbs, and a little fine oatmeal, moistened with skim milk (crumbly, not sloppy). This is given the very young chicks for the first week, after which eggs should *not* be given, but plenty of finely pulped raw onion added, and with it milk curds, and a little dry bone meal and charcoal mixed well through. This not only keeps their bowels in order, but supplies the additional phosphoric acid necessary to quick growth of bone, and increases stamina, thus decreasing the chances of "leg weakness," a complaint to be guarded against. Encourage the very young turkeys to eat millet seed at night, and after two weeks feed on hulled oats for best results, until old enough to have a little wheat or oats.

Keep the young turkeys dry. Nothing kills quicker than long wet grass; once they get a soaking, deaths may be expected. Always keep them in confined pens, well sheltered from wind and rain. Do not on any account allow them on the dewy grass, but keep them in until the sun has dried the grass off a little. Examine all young poults for vermin, which is so troublesome at the back of the head and near vent; hundreds of birds die through no other cause. The pest is similar in habits to the tick, holding on and penetrating the skull. The young birds should be freely dusted with insectibane, and a little carbolic paste applied at the back of the head. Neglect in this matter is the cause of many deaths. The fact that late hatches do not develop as fast as the early hatches is of the utmost importance to all farmers of poultry, be it turkeys, ducks, or fowls. The early chicks may be relied on to produce the best results. The longer a hen lays in a season, the more impoverished she becomes as a result of hard work. Thus we find the embryo becomes smaller and weaker, and it is from these late poults we get bad symptoms, first catarrh, often the precursor to a more serious trouble, *i.e.*, roup, or to make it clearer, a running at the nostrils is observed, and later, symptoms show a swollen head, from which arises an offensive smell.

Onion tops, dandelion, rape, and raw onion finely cut, and white clover, are without doubt the favourite green foods with turkeys; and they are rich in mineral salts, and valuable as correctors of the blood. From five weeks old and on, this can be given mixed in the morning food (pollard, brand, etc.)

If the pasture has a variety of grasses, so much the better, as they prefer variety, but if it be a dry doughty spot, sow lucerne in a 1-acre enclosure. After it becomes established, it will keep you supplied with green summer food, being rich in protein, and also an egg producer.

Area.—One hundred adult turkeys could easily be run on five acres, but, unless the owner is compelled to fence, I would advise giving them full liberty, as they will not require so much feeding. It is rather difficult to say whether three feet and three added wires on top will suffice to keep turkeys in; much depends on the way they have been brought up. If at all wild fifteen feet would not keep then in without doctoring the wing joint.

Domesticated poults are usually tamer than Leghorns, and give less trouble in this respect. I would certainly recommend trying 3-ft. wire, with four plain ones above, but care should be taken when putting in posts. Do not use too thick a post, for this reason, that if the posts are "table-topped" they allow ample room for a gobbler to fly on to; the others will soon learn the habit. Further, wide top posts are a source of great danger where foxes are plentiful. Run the wires above the thick posts, attached to thin hardwood batten. One morning I saw fourteen headless turkeys in a 5-acre enclosure at Buninyong, and traced Mr. Reynard's hair on a thick 6ft. high corner post, which was 25 inches in circumference at top, and unbarked. Had the barbed wire covered the top of the fence this loss would not have occurred.

I would strongly advise all of my readers who have acres in the Riverina, Wimmera, or Goulburn Valley to raise turkeys for market, as they will pay equally as well as lambs. Recently at Geelong I saw prime gobblers realise from 22s. to 27s. per pair at auction. A leading Melbourne firm also informs me that prime turkeys, topped off with a good handful of short white oats at night two to three weeks before marketing, will always command top places. During Show week, and prior to Cup week, turkeys sold at their rooms up to 25s. and 27s. 6d. per pair. Dr. Wight, of Kyabram, makes a hobby of raising turkeys, no less than 150 birds being raised successfully by him during last season. Mrs. Goddard, of Moama, has also had great success with them.

The main thing in marketing is to top off and grade the birds according to size, not putting three big gobblers in a crate with five or six wasters. Mark your crates first, second, and third quality, and you will be quite satisfied when account sales come in. Make the agent your friend, it creates confidence, and he will do his best for you; the farmer who is always chopping and changing about makes a serious blunder. Keep in touch with your salesman; tell him how many birds you will have for disposal, and ask him to wire you when scarcity of white flesh exists. Don't rush him with twenty crates when ten will suffice; the agent usually knows when to advise you to send, and the cost of a telegram often pays.

District Reports.

EMPANGENI, 4th January.—Rain fell on twelve occasions during past month. Total fall registered was 3·05 inches. Blight in amabele first reported 21st ult. On same date information was received to the effect that the *amalanda* birds (species of small white crane) were doing marvellous work in the way of destroying "hopper" locusts. Cattle and all other stock are remarkably fat and sleek. Potatoes produced by Messrs. Patrick Addison, of Lots 105 and 108 Mhlatuzi, and Jan Hoogvorst, of Okulu Store, have grown to as much as a pound in weight and over. Only four head of cattle were reported to have died—two from Gallsickness, one from abscess, and one from effects of being gored by another beast. Many gums, *Auracaria Cookii* and *Casuarina Leptoclada*, were planted about the official buildings and Magistrate's residence to replace other trees which have died out. Four lions were reported to have visited the Thorns, in this Division, between the White Umfolosi and Useleni Rivers, and to have killed two quagga and one rietbok, so far as is known, in their peregrinations.

A. R. R. Turnbull, Magistrate.

IXOPO, 11th January.—During the last month a great quantity of rain has fallen and the crops are looking remarkably well. The floods have done considerable damage to the railway construction works, nevertheless the contractors, under the able directions of Chief Engineer Sweetman, are progressing rapidly with the extension of the line. So far no cases of East Coast Fever have occurred in the Division, but the Border of Alexandra Division is still guarded, owing to the outbreak at Dudutu. Numerous swarms of locusts have hatched out in almost every part of the Division, and I hope before long that officers will be appointed to superintend the destruction of the locusts. [Authorisation to appoint officers has been given. 14/1/07.—Ed., *Ag. Jour.*] It may be interesting to farmers in the Division to know that the following sums were collected by this Magistracy for the year ending 31st December, 1906:—Hut Tax, £7,274 8s.; Dog Tax, £996; Poll Tax, £3,827; Pass Fees, £557; Fees on Medical Licenses, Law 19 of 1891, £183; Squatters' Rent, £571; Native Marriage Fees, £244; Fees on Registration of Christian Marriages, £18 10s.; Fees and Fines, £1,981 17s.; Retail Store Licenses, £153; Tout Licenses, £10; Renewal Identification Passes, £54 5s.; Renewal Poll Tax Licenses, £5; Crown Land Instalments by Natives, £494 11s. 4d.; Fees in Native Civil Cases, £159 18s. 6d.; Fees in European Civil Cases, £135 13s.; total, £16,665 2s. 10d. During the year 1,745 native births and 754 deaths were registered. This shows the natural increase exceeded the deaths by 991.

Frank E. Foxon, Magistrate.

NEW HANOVER, 14th January.—Rain has been pretty general throughout the district, the crops are all looking well as far as growth is concerned, but there are numerous insects at work. The mealies are eaten up with grub, and numerous beetles are making havoc. Hopper locusts are reported throughout the district and are attacking the crops. Government have been notified. Wattle industry is increasing; high prices are now paid, stripping is proceeding. There is a dearth of fruit owing to the hail and frost during the spring. Fowlsickness (Upenyane) still prevails, many farmers having lost all or the greater number of their fowls. Eggs are fetching 1s. 3d. per dozen on spot. Horsesick- has not made its appearance as yet. The district is entirely free from it. There have been no cases of East Coast Fever in this Division.

P. D. Dangerfield, Acting Magistrate.

PINETOWN, 17th January.—Since writing my last report the weather has been very showery, but there has been no heavy fall of rain. Generally speaking, we have had sultry mornings followed by wet afternoons and misty nights. Two mules have died from Horsesickness, otherwise the Division is in a perfectly healthy state. East Coast Fever is, I am sorry to say, spreading, but I have not heard of many deaths. Reports have come in from Illovo, Amanzimtote, Umbumbulu, and Upper Umlaas that locust hoppers are very plentiful and are likely to be troublesome. The mealie crop is looking well, and, judging by present appearances, there should be a good harvest this year. The market here is well supplied with vegetables and pineapples. There has been a plentiful show of mangoes, but, I think, owing to the wet weather we have had, the fruit has fallen from the trees without ripening. Native labour is particularly plentiful just now and the wages asked very low. The Trappist Crossing still remains in a dangerous state.

H. E. Grant, Acting Magistrate.

RICHMOND, 12th January.—For the month of December 6·82 inches of rain were recorded; highest temperature, 93 degrees on 4th and 24th; lowest, 48 degrees on the 6th. The farmers in the Rosebank neighbourhood have suffered severely from heavy storms. In many instances crops have been swept away and replanting rendered necessary. Considerable loss has been sustained by many in having their land, containing artificial manures, washed into the veld. The Byrne district was visited by a tornado, which destroyed all trees and buildings within its range. Oak and other trees, which have withstood the ravages of storms for years, had their branches twisted and snapped off near the parent trunk. Nothing could withstand the fury of the wind. Mr. Cunningham had the roof of his residence blown off, and the circular action of the wind is proved by the fact that the iron forming the roof was deposited on the countryside on every side of the house. The crops, which from their situation were not exposed to the action of floods, look exceptionally well, and give promise of a good harvest. Stock of all kinds are free from disease. On the 22nd and 29th November public meetings were held at the Court House, at the request of the Veterinary Department, to discuss the advisability of placing the Division under quarantine in connection with endeavours being made by Government to cope with East Coast Fever amongst cattle. Veterinary Surgeon Amos attended the second meeting, and explained in a lucid manner the plan of campaign adopted by his Department. After considerable discussion, the meeting, which was attended by the general public, many of whom owned no stock, rejected the proposal to place the Division under quarantine by 26 to 11 votes. It was to be regretted that the farming community was not more fully represented. Many considered that they were too busy on their farms to attend, and were surprised at the decision of the meeting.

A. W. Leslie, Magistrate.

The workman in Queensland is not finding the Compensation Act all that he expected it to be. Under the Act, unless a workman is laid up for fourteen days he can claim no compensation. Now the Act is in force the employer has lost all sympathy, and immediately a man is hurt, say, for only a couple of days or so, his wages are stopped. Besides, if a man is hurt in the bush, before he can claim compensation he has got to get a doctor's certificate. Is it not all beer and skittles.

Gardening Notes for February.

By W. J. Bell, Nurseryman, Florist and Seedsman, Maritzburg.

KITCHEN GARDEN.

Early varieties of Cauliflower may still be sown (excepting in the colder parts of the Colony), such as Early London and Early Erfurt.

Sow for winter crops Cabbage, Brussels-sprouts, Savoy, Scotch Kale, also Radish, Lettuce, Turnip, Carrot, Onion, Spinach, Beet, etc.

The main crop of Broad Beans and Peas should now be sown. Broad Beans should be sown four inches apart and two inches deep in drills four feet apart.

To secure well filled pods pinch off the tops as soon as the lower pods begin to set. A little lime or wood ash should be forked in when preparing the ground.

Sow Peas in drills not less than three feet apart, about 1℔. to 40 feet of drill. A rich soil well pulverised and incorporated with a fair allowance of well decayed manure should be chosen. Varieties that do well are Yorkshire Hero, Pride of the Market, Harrison's Glory, Fillbasket and Doctor McLean.

Celery may now be planted out in trenches, selecting strong young plants about six or seven inches high.

The trenches should be dug out not less than two feet in depth, and should contain about twelve inches of good soil and well rotted manure in equal proportions. The ground selected should be high, where water will not drain into the trench.

Some growers do not use trenches, but make the soil deep and rich and plant in rows, earthing up with the spade.

When earthing up carefully close the stems and leaves to keep out the soil and promote unchecked growth by copious supplies of liquid manure.

The main crop of Cauliflower should be planted out this month in rich ground, as the soil can scarcely be too rich for this crop. Plant the large varieties, such as Autumn Giant and Giant Italian not less than three feet apart and the smaller sorts two and a half feet apart. Should dry, hot weather set in immediately after planting, the young plants should be carefully shaded and regularly watered to prevent a check, which will throw them back several weeks. For the colder districts Brocoli does better than Cauliflower, and may be treated the same in every respect.

In warm districts free from winter frosts, Tomatoes should be planted out in sheltered positions.

Plants now in bearing should be kept watered in dry weather after mulching the surface round each plant with half-decayed manure.

FLOWER GARDEN.

All seeds sown this month will require special care, shading and watering, and all watering must be done early morning and towards evening.

Where frosts are not too severe in winter, the following varieties of flower seeds may be sown now for winter flowering:—Aster, Candytuft, Dianthus, Phlox Drummondi, Antirrhinum, Browalia, Coreopsis, Cornflower, Gaillardia, Godetia, Larkspur, Calendula, Lupin, Mignonette, Nicotiana, Pansy, Stock, and Petunia. Where the soil is poor and hard a special preparation is necessary, and some well decayed manure, leaf or vegetable mould with a little sharp sand should be forked in where the seeds are to be sown. This will form a good surface, which will not be so liable to harden with alternate rain and sun. Make the surface fine by passing some of the compost through a sieve, and, after giving a good soaking with water can, sow the seeds thinly and evenly and cover slightly with a little of the same compost also passed through the sieve, just sufficient to cover the seeds. In the case of larger seeds cover a little deeper.

Afterwards cover with grass, hay or straw. This may be partly removed as soon as the seedlings appear, and then as they get stronger remove the shading altogether choosing a dull day if possible. What is required is to gradually accustom the young seedlings to the sun as they become strong enough to bear it.

Evergreens may still be planted with success during wet and cloudy weather, and it is a good time to put in all kinds of evergreen fruit trees, including Oranges, Naartjes, Lemons, Loquats, China Guavas, Mangoes, Avocada Pears, etc.

Thuja and Japan Privet fence plants will do well planted now, choosing favourable weather. These for fence purposes should be planted half a yard apart, taking care to cut away about a third at least of the wood from the top when planting.

Where wind breaks are required, the sooner these are planted the better. For up country, hardy Cypresses of a spreading habit are the most suitable and effective, as they will stand frost and wind better than most things and are fairly quick in growth, and to make a variety several kinds of Pines may be included.

For the warmer districts the planter has a wider choice, and may include Eugenias, Lagunaries, Blackwoods, Australian Willows, and Gums.

Some Kraal Manures.

By Alex. Pardy, F.C.S., Analyst.

The results of the analyses of some local manures recently received from various sources are of some interest, in that they show very marked differences in composition, due largely to their sources and the conditions under which they have been laid down.

The following gives some of the details of these manures:—

	I.	II.	III.	IV.	V.
Moisture	68·08	59·60	32·11	41·66	16·11
Organic and volatile matter . .	21·34	30·84	16·13	30·16	54·41
Ash (including stones, etc.) . .	10·58	9·56	51·76	28·18	29·48
	100·00	100·00	100·00	100·00	100·00
Nitrogen	0·56	0·62	0·55	1·47	1·65
Phosphoric Acid	0·28	0·17	0·34	1·20	0·49
Potash	0·50	0·45	0·69	1·38	1·66
	1·34	1·24	1·58	4·05	3·80

No 1 from calf sheds contains a higher percentage of moisture than any of the others; it represents a fairly well-rotted manure well mixed with hay bedding and made under shade.

No. 2 is of mixed origin associated with a large proportion of litter; it had been collected in sheds and afterwards placed outside in a loose heap exposed to the weather, consequently it shows signs of having suffered thereby.

No 3 is a stable manure of a much drier nature than either of the preceding two; the sample contained a large amount of earthy and stony matter, which detracts considerably from its value, weight for weight of dry matter eliminating the stones; it is richer than No. 2. A cleaner sample would show a fairly high fertilising value.

No. 4 represents a carefully prepared manure consisting of cattle droppings mixed with a small quantity of bonemeal. Very little litter of any kind is incorporated in the sample, consequently it is nearly pure dung, plus the little bone meal. The phosphoric acid in the sample is very much higher than that in any of the others, due to the bone, which has considerably enhanced its value. All three constituents are well represented.

No. 5 is of the same nature as No. 4, with the exception that no bone meal had been added. It is drier than No. 4, and, if equal weights of dry matter be taken, is poorer all round.

The amount of fertilising ingredients contained in the various manures per ton is as follows:—

	No. 1	No. 2	No. 3	No. 4	No. 5
Lbs.	26·8	24·8	31·4	81·0	76·0

It is almost impossible to place a value on such manures as these as the agricultural value does not depend on the essential ingredients alone, but is due probably in greater part to the organic matter and the peculiar nature of the material, so that a mere trade valuation would not adequately represent either the commercial or agricultural value.

These are complete manures, containing, as they do, all the elements necessary to plant growth, and when used either alone or supplemented with artificials form an acquisition to the farm which cannot be too highly estimated or on which too much care cannot be bestowed.

ALEX. PARDY, Analyst.

Correspondence.

HELLEBORE FOR KILLING TICKS.

To the Editor of the "Agricultural Journal."

Sir,—I have been transport-riding for a good number of years (28), and have tried a good many so-called remedies to kill ticks. For the last six years I have worked between Port Shepstone and Kokstad—a tick-infected district, with the tortoiseshell tick most prominent. Hellebore powder mixed with oil or melted fat is the only remedy I find that will kill the black and white tick, called by the kafirs "Xoloquibe." I will guarantee that with one dressing of Hellebore that the ticks will die and drop off within a week from the day of dressing. The Government dip has absolutely no effect upon the Xoloquibe.—Yours, etc.,

W. H. STAFFORD.

Brookside, Harding.

[With regard to the above, Mr. Power, of the Veterinary Department, says that hellebore is well known as an efficacious and useful agent for destroying ticks by hand-dressing. With respect to Mr. Stafford's last remark, Mr. Power says that when the arsenic dips are fresh they kill the ticks, but when they grow stale that power diminishes.—Ed., *Ag. Jour.*]

BRAZILIAN LINEN.

To the Editor of the "Agricultural Journal."

Sir,—I enclose a cutting from an American paper which may be of interest. It describes a new fibre which has been discovered in South America. Perhaps the Director of Experiment Stations might be induced to give it a trial on the Coast Experimental Farm. The following is the cutting:—

The American Consul-General at Rio de Janeiro has submitted a report to the Washington Department of Commerce on the plant known as "Brazilian linen," which he thinks may revolutionise the linen industry of the world. The new plant, which is indigenous to Brazil and some of the great fertile plains of South America, is technically described as "Canhamo brazillensis perini," being named after its discoverer, Dr. Victorio Antonia de Perini, and its practical development is now being effected upon several experimental plantations. The development was commenced with the assistance of the State Government, and has continued to a point where is may be stated without fear of question, according to the report, that the fibre is a success and that its influence will be felt at once in the fabric world. The product of the plantations now established has been contracted for by British interests at a very profitable rate. The plant grows from twelve to eighteen feet high in four or five months, resembling in general appearance the hemp. It is absolutely hardy. Three crops a year can be had. The discoverer and the Brazilian interests claim that they can produce a fibre equal to the best European lines, and that this plant can be grown under such conditions that the production of this fibre will be cheaper and greater than that possible with the European article.—Yours, etc.,

R. W. BRADSTREET.

Toronto, Canada, 15th November, 1906.

THE AGE OF A HORSE.

To the Editor of the "Agricultural Journal."

Sir,—In last month's number of the *Agricultural Journal* I noticed an extract in it taken from *The Field* referring to the age horses have been known to attain, and I give you the following case which I am sure will interest you and your readers:—

While planting in India, I had charge of a property which adjoined an estate which had been 35 years in existence at the time I left the district. On it there was a pony which first came as a four year old and had seen the development of the estate from the time the first tree was cut, and had faithfully served four successive managers. The last time

I saw "Billy," as he was named, he was fully 39 years old, full of life and quite strong. Although he was not ridden by his master at all, yet he was well able to carry the children, and to whom he seemed devoted, following them about like a dog. He was never confined but allowed to go wherever he liked, and, in recognition of his long service, had an attendant to himself and the very best of care. "Billy" was a Royal Pegu, an almost extinct variety of pony found in Burmah. They are noted for their speed, endurance and extraordinary hardiness, a journey of 80 to 100 miles on end being nothing very difficult for them to perform. In character they are somewhat like our local Basuto but better shaped, bigger, and much more handsome. "Billy" died the following year after I last saw him, from sheer old age, being then full 40 years. He was, bar natives, the oldest inhabitant of the district, and quite a notoriety.—Yours, etc.,

W. A. GILBERT.

Barnesdale Tea Estate, Ifafa.

Export of Citrus Fruits.

At the request of the Conservator of Forests, the following notice is repeated:—

In order to encourage the export of citrus fruits during winter, the Minister of Agriculture has arranged that 500 cases (one cubic foot each) will be carried freight free as deck cargo to England, the boxes and local rail transport also being supplied by Government, while the sender supplies the fruit and receives the returns. It is desired that fruits from many farms be included in this consignment. Those who wish to take advantage of the opportunity should apply at once to the Conservator of Forests, who has the matter in hand. The fruit should leave Natal about the end of April or early in May, and the Orchardist, Cedara, will previously visit such centres as can be arranged in order to show how the packing should be done.

In September, 1806, a pony 11 h. 2 in. high, belonging to a horsedealer of Chard, was backed to travel 100 miles in sixteen successive hours. The course chosen was between Honiton and Exeter, a distance of sixteen miles, and this the pony was to cover six times with an additional four miles to compete the hundred. Ridden by a lad weighing little short of ten stone, the pony started at 4.15 a.m. from Honiton, and being liberally rested between the journeys. performed the undertaking with the greatest ease in 13 hours 50 minutes, or 2 hours 10 minutes less than the time allowed.

A Scotch Dairy Farmer.

MILKING MACHINES.

A correspondent sends a copy of *The North British Agriculturist* containing a report of a recently delivered address by Mr. Alex. Millar, Huntly Farm, Dundee, on dairy-work. The character of the address and the discussion ensuing is so practical and interesting that we willingly adopt his suggestion to reproduce the report in these pages.

Mr. Millar said: When I received the invitation of your committee to lecture on "Dairy Cows and their Management," I replied at once that I did not think I had any special message "burning to be delivered." It was, however, pointed out to me that a few notes of personal experience might initiate a profitable discussion, so it is only in this hope that I appear before you. I make no pretension that my particular method of management is original or ideal. It has simply been evolved gradually as the necessities of my market and my general farming operations seemed to require. My special line in dairying is butter-making. All the produce of my dairy of 150 cows is sold as butter and butter milk, and as I have a good market in Dundee for butter milk, I churn "whole milk." Separated milk I could dispose of only in very limited quantity, so my market determines my method of manufacture. My special line also determines the

KIND OF COWS

I prefer. For butter-making Jersey cows are undoubtedly the best, but in our northern climate they are not hardy enough to be kept extensively on ordinary commercial lines. So I make Ayrshires my mainstay, and young Ayrshires especially, for I find that when a cow gets up in years she may continue to give quantity of milk, but her digestive apparatus tends to get trickier, and she is not to be depended on so thoroughly for butter-making; so I generally buy Ayrshires, or first crosses off Ayrshires, carrying their second calf, and keep them, if good ones, for the four or five years of their prime. I thus try to steer clear of that wasteful system of keeping cows for only one milking period, and then passing on good dairy material to the butcher—a system that is largely responsible for the tantalising disproportion between the inbuying and outgoing price of our dairy cows at the present moment. Of course, I get landed into cows sometimes that are too long with me at one year, but, on the average, I get four years' use out of my stock, and then what I get for the carcases is profit. I keep three pure-bred Aberdeen-Angus bulls, the cross calf resulting being almost invariably pure black or pure red, and for these first crosses I have a ready market in the hill farms of Perthshire and Forfarshire. For these "keepers" my regular price for many years has been 50s. for bull calves, 40s. for heifer calves, and this amply defrays the cost of giving the cows a two-months' rest. For my business I require to have my cows calving regularly all the year round. Four calves per week keeps me about right, and thus enables me to keep up a daily supply of 370 gallons, which is what I aim at with 150 cows' milking. As Ayrshires are not much bred in the east of Scotland, I have to come to the west country—usually to Lanark and Wishaw—

TO REPLENISH MY STOCK.

At one time I was in the habit of coming and buying a wagon or so just when I required them, but for a good number of years now I have found it a better policy to buy "back-calves," and graze them. Formerly I had a good many losses, especially in hot weather, through cows going wrong at the calving after coming off the long railway journey, and perhaps having been passed through several marts before I got them, and that at a time when they were ill fitted to stand up against the fatigue of so much knocking about. When I have cows grazed beside me for a time, and well rested, they come through the calving risks much better; and even though sometimes I may not have much for the grazing of them, the lessened mortality keeps the profit and loss account nearer right. And as it is a wise policy to stock the fields heavily so as to make dry cows work for their living, and not lay on too much fat, the cost of grazing does not amount to a great deal. But buying "back-calves" is a risky business too. A good many dairy misfits find their way to the "back-calver" sales—knickers, small teats, and other undesirables are sometimes conveniently got rid of when in this state, and I expect I have had my full share of them. For seven months of the year along the east coast our cows manage for themselves in the fields. Grass comes very early with us—we usually have our cows out about the middle of April. But there are one or two matters connected with their general management that I would advert to first. Cows in the summer months suffer greatly from heat and flies—I have known a drop of twenty gallons due to a single day's galloping. It may seem a paradox to say that cows require shelter quite as much in summer as in winter, but it is a fact nevertheless, and anyone who will endeavour to supply them with shade will be well repaid for his trouble. Clumps of trees, tall hedges, and even sheds are a good investment in this line. Though well-trimmed hedges look neat on a farm, I think the cows would much prefer them a bit rough. The torment which cows suffer from clegs, warble flies, and such like is so great during bright sunshine that something ought always to be done to relieve them. In addition to shade, it is also of special importance that they should have

PLENTY OF GOOD WATER.

When we remember that milk contains 87 per cent. of water, and that a cow will use up for milk-making purposes alone from three to four gallons daily in the flush of yielding, over and above what is required in the vital processes of digestion, we can understand that the water supply must not be scrimp. The best supply is in the form of a running stream or river—these farmers who can command a running water into which the cows can go and stand in the shade of the trees during the hot part of the day are much to be envied. Another point of some importance for keeping stock healthy is the providing of rock salt to cows in the pasture fields. In an ordinary cattle ration there is about three-quarters of an ounce of salt, but a milk cow requires a good deal more than that. The milk drains away fully an ounce per day out of the system, and unless this is supplied the ash material of their vegetable food does not yield enough. It is most instructive to watch how regularly a cow will come for her "salt lick" once she knows where it is to be found, and at the end of the grazing season there is a very noticeable difference between cows who have had regular access to salt and those who have not. The management of dairy cows in summer is a comparatively simple matter. Their principal food then is grass, which they collect for themselves. Old pasture will yield most butter and cheese per gallon of milk, but new grass will give the largest quantity where the number of gallons is of importance. In some cases the grass may be so good that nothing more is required to make the cows yield their utmost, both in quantity and quality, but oftener it will be found that the addition of some

EXTRA FEEDING MATERIAL

will pay. This usually takes the form of some variety of cotton cake, which, from its binding nature, is specially suitable for counteracting the laxative properties of luscious grass. My own practice is to allow all cows in milk 3 to 4 ℔. per day of "Angus" cake, a brand well and favourably known all along the east coast, and which is guaranteed to contain 50 per cent. of cotton seed meal. Bean meal, made into a ball of dough with warm water, I have also used, but this takes more work, and is not so cleanly to handle. By mid-summer, with our limited rainfall on the east coast, pastures often get brown and bare, so I always plan to have a few acres of rye ready to give the cows a green bite. After the rye is shot it ceases to be palatable, so we then give cutting grass, and when that gets ripe, green beans are spread on the pastures. When these are ripe second crop hay is available, and then cabbages. All this supplementary food is spread on the fields, and I find the cows use it up with quite as little waste as there would be if fed in the stalls, and it lessens the labour of the byremen quite a bit. In the case of cabbages, too, it keeps the byres much sweeter when the cows are put out in the morning after milking they find their cabbage ration awaiting them. Eaten in the open air, the essential oil, or other aromatic compound which exists in this plant, gets dissipated out of the system before the next milking comes round, and we thus get rid of that objectionable flavour to the milk and its products which cabbages and soft turnips are so liable to impart. The change on to the

WINTER FEED AND MANAGEMENT

is done gradually. The cows are kept indoors at night so soon as the weather begins to get cold and stormy. As the time goes on, the period they are allowed outside becomes less and less, until they are restricted to about an hour or so. The winter yield of milk has, to a certain extent, to be kept up against Nature by a forcing feed. Naturally, the cows give their full yield of milk in the summer time when the grass is at its best; to make them do the same in mid-winter means a large quantity of rich and costly food. In my experience, it costs two to three times as much to keep a cow during the winter five months as during the summer seven, and the small extra price per gallon is not anything like in proportion to the greater cost of production. The greatest drawback to a cow yielding full milk in winter is the cold—a frosty night or day being immediately followed by a decrease in the milk yield. For those animals which are dry the cold does not matter so much, but those in milk must be kept as warm and comfortable as possible. One of the best things for promoting this end is the use of warmed food. Warm mashes, composed of chop mixed with meals, and made into a sloppy mess with warm water, and fed at blood heat, is the best expedient for keeping up the milk yield. Cold roots I use very sparingly, and more as an appetiser than as a food. My daily bill of fare at present is something like this:—At 5 a.m. a warm mash, composed of dried grains, ground oats, bean meal, and molascuit is fed, followed by a foddering of sound oat straw; at ten o'clock two stones or so of whole turnips is fed, followed by a good allowance of first crop hay; at four o'clock 4lbs. of "Angus" cake is served out to them, followed by a warm mash, the same as in the morning, and a good armful of oat straw rounds off their day's allowance. A cynical friend of mine, smarting under the not uncommon trouble of term changes, remarked to me the other day that the most difficult part of the management of dairy cows is

GETTING THEM PROPERLY MILKED.

It is no exaggeration to say that the best animals fed and cared for in the best manner may turn out poor yielders if milked by one who cannot, or will not, take the milk from them properly. And good milkers are getting scarcer. The art of milking must be learnt when young; no other work makes higher demands on the tact and temper of the worker. Ill usage or jerky milking spoils many a good cow. A bad-tempered milker is a continual heartbreak, and may neutralise months and years of careful breeding and feeding. There seems also to be a growing dislike to this kind of work—an advertisement with "no milking" brings ever so many more replies. Then, the greater facilities for getting to evening entertainments nowadays renders the milking time next morning a sleepy affair, so that, what with incompetent, or bad-tempered, or sleepy milkers, the lot of the dairy farmer many a time is not an enviable one. To add to these troubles, some infectious disease may break out, say, in some of the ploughmen's families, and the wife milker is debarred from coming to the byre. I was at one time in the unfortunate position of having seven men's wives off at one time through an outbreak of scarlet fever among the cottar children. The mothers themselves were fit enough, but the doctor's notification made their help impossible for six or seven weeks. To get behind these difficulties of milking time the pious wish has many a time been expressed that some mechanical means were available to lighten this burden of daily worry. For fifty odd years repeated attempts have been made to put a milking machine on the market that would milk the cows and not abuse them, and be aye ready when required. It is fully ten years since I first began to use a

MECHANICAL MILKER.

The "Murchland" was my first venture, and I worked it continuously for some years with varying success. It milked the cows fairly well, but it was so troublesome to keep clean that it created labour rather than saved it. Then, it had a peculiar effect on the cows' teats. Working by continuous suction, it caused the skin of the teat to adhere to the metallic lining of the cup, and thus interfered with the blood circulation, so that, when the cups were taken off, the teats were often blue. However, it worked away quietly, and never spoke back—and for that I liked it—so I kept it going, hoping against hope that something better would turn up. When at last the Lawrence Kennedy machine appeared with its pulsating movement, I saw at once that it solved one working difficulty—

the interference with the blood circulation. The "catch" and "relieve" of the pulsating movement—so closely resembling the action of the calf's mouth sucking—made it evident that there would be no more blue teats at anyrate, and the rubber tubing of the Lawrence Kennedy machine looked as if it would be much easier kept in order. So I had it fitted up experimentally at Huntly Farm, and, after three months' trial of it there, I was so well pleased with its work that I ordered an installation for my other farm, and for almost two years now I have had this machine working twice daily on two separate farms, and managed by two separate staffs, milking twelve cows at a time on the one farm, eight at a time on the other. I have thus been having experience in duplicate form, and, having been for years in the habit of keeping an accurate note of the milk brought from the out farm, I am in a position to compare results with years of hand-milking. Taking the year ending 15th November last, and comparing it with the out-turn of 1904, with the same number of cows milking, viz., fifty, and fed, and treated in pretty much the same manner, I find there is a balance in favour of the machine period of 187 gallons. When I compare the average of the four years before 1904, the balance is 196 gallons. This is not very much per cow if spread over twelve months, but it is on the right side. I am not able to give such accurate figures for Huntly, as for a time some were milked by hand, and the milk was all totalled together, but I can compare the out-turn of butter during twelve months of machine milking and twelve months of milking by hand, and here again the out-turn is slightly in favour of the machine period. When I made my calculations previous to ordering an installation, I did so on the supposition that possibly the machine might do almost as well as hand-milking, but the result has bettered my expectation. Then, I find another point gradually coming into prominence. The cows

ACTUALLY THRIVE BETTER

when machine milked. Almost all take kindly to it from the very first. It is so regular and gentle in its action that even the most nervous cow soon forgets her nerves. The cow knows exactly what to expect when the machine is set agoing at her teats, but it would be a very knowing cow that could tell beforehand what to expect from a band of hand-milkers, especially if there had been some quarrel in the kitchen or on the way to the byres. Of course, with two separate installations, rendered necessary by the distance between the farm steadings, I am not favourably placed for working with the utmost economy. I have two engines to keep going where one could suffice, and I have one operator and one stripper more than would be necessary if all the stock were housed together, but my experience enables me to see that three operators, working nine machines, and two strippers, would easily milk 150 cows in an hour and a half. There is thus a saving of ten milkers. Against this, my coal account for the year is £15 more, and repairs and renewals total £8 7s., so that there is a very large balance to make good depreciation of plant and meet the interest on the first cost. A discussion followed.

Mr. Gilmour, Alderston, Bellahill, said that if a man was to keep a dairy stock successfully he must attend to the housing, feeding, milking, and general management himself. Personally his dairy paid better than any other branch of his farming.

Mr. Robt. Wilson, Manswraes, said he did not know much about milking machines, but he knew that cows well milked were very much more remunerative than those that were badly milked. He was satisfied that both the health of cows and their produce were improved by giving salt in the fields.

Mr. Jas. M'Adam, Craigley, Castle-Douglas, would have liked Mr. Millar to have described the best type of a dairy cow. He thought that the shelter of trees and hedges in summer produced weeds in cows' udders. He would like to hear Mr. Millar's remedy for cows running about in the heat of the day in summer.

Mr. Wm. Stewart, Milton, Duntocher, said that in the west of Scotland they could not have their cows out seven months of the year. He corroborated from experience what Mr. Millar had said in regard to the Lawrence-Kennedy milking machine. It did its work quietly and well, and if properly looked after was a thorough success. A girl newly left the school could work it. If a pure milk supply was to solve the question of infant mortality, such a supply must come through the milking machine.

Mr. Jas. Stirling, manager of the Glasgow Dairy Co., said he would have liked to have heard a little more of the milking machine. It seemed to be a success where the master or the mistress took an individual interest in it, but in the hands of indifferent servants the results were not so satisfactory. He was glad to hear, after years of complaining, farmers candidly confessing that dairying was the best paying subject they had.

Mr. Sillars, Fenwick, did not think many farmers would say that dairying paid well. What they said was that there was nothing else paying. Would many of the prominent Glasgow dairymen present that evening be content to do the same work that the dairy farmer did for the same remuneration? They all welcomed the good news about the milking machine, but he would like to be told how bad Mr. Millar's hand-milkers were in order to compare their work with that of the machine.

Mr. John M'Caig, Stranraer, approved of giving salt to stock in summer as well as in winter. He agreed with Mr. M'Adam as to the risk of shelter. He gave his stock a wash of M'Dougall or some other safe dip along the spine, and this ensured perfect security from clegs and other insect pests. He did not know much about the milking machine, but was not sure that he would view its introduction as an unmixed blessing if it was going to put the old women aside.

Mr. Taylor, V.S., Cathkin, condemned the system of hawking young cows at the drop through the auction marts. If farmers had more house room they would not buy cows at the drop so extensively as they did.

Mr. J. Wyllie, Knowewart, wished to know if queys took readily to the milking machine. It would not do on wet land to feed green stuff to cows in the field, as it would get spoiled by potching.

Mr. R. Wilson, Dunlop, advocated the keeping of milk records. In his own case a record kept for a year had shown that they had cows giving as much as £30, and one as low as £7 10s. per annum, and all fed and cared for in the same way. The keeping of a record would stimulate a man to improve his stock, and, if possible, do better the next year than he had done during the previous one.

Mr. Spier, Newton, agreed with the lecturer as to the use of an

Aberdeen-Angus bull with Ayrshire cows where they were not breeding stock to rear themselves. He would advise all farmers within a radius of ten or fifteen miles of Glasgow who were not raising their own stock to use an Aberdeen-Angus bull. He did not see that the Lawrence-Kennedy milker milked a bit cleaner than the Murchland one. They should not attach too much importance to increased yields from the cows with machines, as the yield might have been affected by a variety of other circumstances.

Mr. Dunlop, Midlands, said the time they needed a good catch crop was in spring. He had tried sowing rye in September, and he believed it would do. He had a neighbour who tried green beans to his cows, but lost two of the best, and stopped it.

The Chairman said there was always room at the top for the best butter and cheese. He was under the impression that their cows were not so good as they were thirty years ago. The commercial, the dairyman's, and the show cow should all be one and the same animal. The secret of the popularity of Danish butter was that it could be got all the year round, and of the same flavour. In spite of the extra cost of feeding, dairying should pay as well in the winter as in the summer.

Mr. Millar, in reply, said he was thoroughly convinced that winter dairying did not pay. If it were not for the profits of the summer time he could not make it pay in winter. He was not of opinion that cows were better thirty years ago than now. He grew seven to ten acres of green beans every year, and he had never lost a cow by feeding with them. nor had any trouble. There was nothing produced more milk or butter than beans. In his district they were favourably situated as to grass in spring. The month of July, and perhaps the first fortnight of August, was their worst grazing period. It was then he found the supplementary food, such as rye and green hay, and then beans, useful. He was pleased to find that the milking machine gave an increased yield, although it was a small one. He did not think that his hand-milkers were worse than those of his neighbours. His dairymaid found that the Murchland machine was difficult to keep clean. There were ninety parts that had to be taken down twice a day and cleaned. With the Lawrence-Kennedy cold water and then hot were run through the pipes, and they did not get tainted. The cows never resented the Lawrence-Kennedy from the first. They had never been beat with any cow, nor had they any expense from machines being damaged or broken. He did not want them to follow Mr. Spier's advice as to using an Aberdeen-Angus bull, because the produce would likely find its way north, and lower his returns. He could not keep a milk record, because the machine milked two cows into one can. He had never experienced any difficulty in milking queys with the machine; in fact, they were easier handled than cows which had been accustomed to hand-milking. They had to have strippers after the machine, but they had to have that with hand-milkers. A person of average intelligence could work the machine. The term changes had less terrors for him now than formerly. His practice was to house his cows in the heat of the day in summer, as they were out all night. When they were tied by the neck they did not gallop. (Laughter.)

Votes of thanks to the lecturer and the chairman terminated the proceedings.

Veterinary Departmental Reports for Month of December, 1906.

ABSTRACTS FROM REPORTS.

MINISTER OF AGRICULTURE,—

Sir,—I have the honour to forward my monthly report for December, 1906, also those of the District Veterinary Surgeons and Stock Inspectors.

Sheep Scab.—There have been seven fresh outbreaks of this disease and 43 licenses raised.

Lungsickness.—Two fresh outbreaks occurred during the month, one in the Newcastle district and the other in the Dundee district.

Glanders.—One animal destroyed in the Utrecht district and two in Zululand.

Horsesickness.—Fifty-seven deaths reported as under:—

Vryheid	4
Umvoti	3
Utrecht	2
Weenen	2
Alexandra and Harding	5
Dundee	1
Durban	19
Upper Umkomanzi	1
Eshowe	4
Melmoth	2
Nongoma	7
Pulpietersburg	2
Mahlabatini	3
Umlalazi	1
Maritzburg	1
Total	57

East Coast Fever.—During the month the following outbreaks occurred:—

Lower Tugela and Mapumulo	2
Inanda	1
Vryheid and Ngotshe	5
Durban County	4
Paulpietersburg	1
Zululand	2
Total	15

The following deaths are reported from East Coast Fever:—

Lower Tugela and Mapumulo	115
Vryheid and Ngotshe	290
Alexandra County	4
Dundee	5
Durban County	42
Zululand	479
Paulpietersburg	4
Total	939

With reference to East Coast Fever, it would appear that there are still many who will not realise the difference between East Coast Fever and ordinary Redwater or Texas Fever, and there are some apparently who still maintain that the two diseases are identical.

East Coast Fever and ordinary Redwater or Texas Fever are two distinct diseases, caused by separate and distinct parasites. Clinically and on *post-mortem* the symptoms and lesions are very identical, as is the case with all diseases caused by protozoic organisms affecting the blood. The different characters between East Coast Fever and ordinary Redwater or Texas Fever are briefly as follows:—

ORDINARY REDWATER OR TEXAS FEVER.	EAST COAST FEVER.
1. Communicated by the common tick (Rhipicephalus decoloratus), and transmitted through the egg stage.	1. Communicated by the Brown tick (Rhipicephalus appendiculatus), Black pitted tick and others, but not by the common Blue tick, and the infection is not transmitted through the egg stage.
2. The disease can be communicated from one animal to another by blood inoculation.	2. The disease cannot be communicated from one animal to another by blood inoculation.
3. The chief action of the parasite is to break up the red blood cells, and in consequence we have marked anaemia and frequently red urine.	3. The parasite does not break up the red blood cells; there is no anaemia and no discoloured urine, unless double infection or ordinary Redwater and East Coast Fever exist at one time.
4. A recovered animal is only immune while exposed to infected veld.	4. A recovered animal is immune for life.
5. A recovered animal while exposed to infected veld carries the parasite constantly in its blood, and its blood is constantly virulent and maintains the infection through the ticks.	5. Recovered animals do not carry parasites in their blood, the blood is not virulent and does not maintain the infection through the ticks.
6. Animals immuned to ordinary Redwater or Texas Fever are entirely susceptible to East Coast Fever.	

MICROSCOPICAL DIFFERENCES.

ORDINARY REDWATER OR TEXAS FEVER.	EAST COAST FEVER.
Parasites of ordinary Redwater in their typical form are large pear-shaped bodies in pairs within the blood corpuscles, and it is usually found that not more than 30 per cent. of the corpuscles contain the parasites. In recovered or immuned animals these parasites do appear as rod-shaped or oval bodies resembling the East Coast Fever parasite, but they are never numerous.	The parasites are small rod-shaped bodies within the blood cells frequently three or four parasites irregularly placed in one cell, and in typical advanced cases of the disease 90 to 100 per cent. of the corpuscles may contain these parasites.

It is hoped that all interested in the welfare of Natal will accept that there is a new disease existing in several parts of the Colony in the form of East Coast Fever, and I would earnestly appeal to the cattle-owners of the Colony to consider the position and do their utmost to dispel the apathy and unbelief which exists in many quarters. We can understand the natives' mind being unable to grasp all the facts concerning East Coast Fever, but we are entitled to expect that the white population of Natal as a whole will realise that we are faced with a new disease, and that by taking practical precautions to protect their cattle will set a good example to the natives.

The first step necessary is for all to realise we are faced with a serious disease. The greatest disadvantage we labour under in our endeavour to combat the disease is the attitude of those who will not learn until they have had actual experience to their own cost. If East Coast Fever spreads generally throughout Natal, and at the present time the position is very unsatisfactory, that section of the community who will not believe we are faced with a new and serious trouble will undoubtedly have contributed their share towards its spread. It is recognised by all that one of the chief obstacles in combating any stock disease in this Colony is the fact that we have a large native population carrying on, as their chief livelihood, cattle-breeding, but it is regrettable to note that this obstacle is greatly magnified by the attitude of individuals who treat the matter with ridicule, and behave, in so far as their cattle are concerned, as if no danger exists. Even individuals, who claim to have considerable influence with the natives, and other cattle-owners, have preached the doctrine that East Coast Fever does not and never has existed, and in many cases we have been compelled, with a view to removing this opinion, to allow the cattle of such people to die out in order to prove definitely the mortality which attends this disease, and also to allow them to try every remedy which can be imagined, with the known result of failure. It is true that when anyone has had actual experience he knows with certainty the result of East Coast Fever, but it is also true that it is those who have had no experience who oppose the existence of the disease and the necssary steps taken to prevent its spread.

East Coast Fever is undoubtedly the most treacherous and insidious disease which has ever visited South Africa, and its effects are the most certain, and I am positive of what the result will be unless the European population as a whole are prepared to face the hard practical facts before them at the present moment. As previously stated, we realise we have to face ignorance and apathy on the part of the natives, but if we have also to meet this on the part of a certain section of the European population the position will become hopeless, except as regards those stock-owners who will protect themselves by realising the facts before them. Those who hold that no East Coast Fever exists in Natal, or that ordinary Redwater and East Coast Fever are identical, are a menace to the welfare of the stock-owners of this Colony.

The present position as regards East Coast Fever is most serious, and the experience of the last three or four months has proved to us that not the least danger tending towards its spread is the apathy and indifference displayed from many sources, and I feel it my duty in consequence to write in the strain I have as a warning to the public. All who have followed the course of this disease know the opposition we met with in dealing with it in the Vryheid district, but, in fairness to that district, their opposition has been no greater than that offered in some of the districts of Natal to the regulations necessary in preventing its spread.

We who have studied this disease, and watched every detail of its progress, and also profited by the experience gained in other Colonies, know what the end will be if, in our efforts, we have not the full support and co-operation of every section of the farming community. It is fortunate, as shown by the work done by the several committees, and the results of the meetings held with reference to East Coast Fever throughout the Colony, that the greater proportion of the farming community do realise the seriousness of the position, but it is also true that those who will not realise what is before them are the people who appear to bring their views to the greatest prominence.

S. B. WOOLLATT,
Principal Veterinary Surgeon.

STANGER.—D.V.S. DONALDSON.

East Coast Fever.—The total number of deaths reported is 115. Two new outbreaks; one at James Umlow's, at Junction, Glendale, Mapumulo Road, and one at Sinkwazi's, near Darnall, amongst Indians' cattle. 214 cattle and 12 calves have been sent to Umhlatuzan. 329 cattle and 63 calves have been sent with D.V.S. Hutchinson to the Rand.

Otimati Camps.—No 2 Camp (the loot stock) has been closed. No. 3 Camp will in a few days also be closed, as the cattle will be handed back to their owners.

No. 1 Camp (Transport).—I am writing you a separate report, attached.

Nonoti Camps.—The cattle at these camps are healthy, and no disease has appeared during the month.

Mapumulo.—The disease is very bad in this part, and it is impossible to state the total number of deaths; in many cases whole herds of natives' cattle have died.

Tongaat.—E.C.F. has broken out in the village amongst Indians' cattle. Eighteen cattle went to Umhlatuzan on 31st December. More are being railed.

LADYSMITH.—D.V.S. WEBB.

Scab.—Three flocks under license in Ladysmith district; none under license in Bergville district.

Mange in Goats.—This disease is very prevalent amongst the flocks owned by natives in both districts.

East Coast Fever.—None exists in either district.

Horsesickness.—No cases have been reported.

Fractured Radius.—The thoroughbred entire recently purchased by Mr. A. W. Illing had the misfortune to fracture the radius just above the knee. I tried to fix a special splint and place the horse in slings, but the horse strongly objected to both. Mr. Illing was loth to destroy the horse so turned him on the veld. Ten days after the accident the bone had penetrated through the skin, and it was apparent that no chance of recovery existed. As an experiment, I placed the horse under chloroform and amputated the leg, but the horse died the same night, apparently from surgical shock.

VRYHEID.—D.V.S. BECKER.

Horsesickness.—Four cases of this disease have come under my notice this month. It is anticipated that the mortality from this cause is likely to be heavy this season.

Scab.—Three licenses have been raised during the month, and one flock reported as still under license.

East Coast Fever.—Mortality amongst cattle has been fairly heavy, and a number of deaths, particularly amongst native cattle, have not been reported. The returns given are therefore only approximate (290), and I am of opinion that they err by being, if anything, too moderate. Five fresh centres of infection have been noted during the current month, and the progress of the disease, if steady, is none the less sure and certain. Babanango still appears clean, and it is to be hoped that if the quarantine line is rigidly enforced East Coast Fever will not break out there. The great danger lies in possible infection prior to the formation of this quarantine; as far as we can see at present this is not the case. A number of cattle left the district for slaughter purposes during the month.

GREYTOWN.—D.V.S. CORDY.

Scab.—Six fresh outbreaks have occurred.

Glanders.—A clinical case of this disease having occurred among mules working between Greytown and some gold mines over the Ngobevu Drift, in Zululand, I tested three spans of these animals, thirty in all, before they returned to Maritzburg. None of these showed any reaction.

East Coast Fever.—At the end of the month suspicious cases of this disease occurred on Mr. Edwards' farm, on the Greytown-Muden Road, and about six miles from the site of the Muden outbreak. The cattle have been placed in strict quarantine until the nature of the disease has been definitely proved.

It has been necessary to place the cattle of Mr. John Keyter, of Frogmore, Krantzkop district, in quarantine owing to the owner not complying with the Regulations. As East Coast Fever was in such close proximity to the Krantzkop-Mapumulo boundary, it was not considered safe to allow wagons to travel nearer the boundary than the foot of Balcomb's Hill. In spite of having been informed in writing as to these Regulations, one of Mr. Keyter's wagons was sent to the top of the hill and there outspanned.

It is much to be regretted that so large a stock-owner should take up such an attitude, as, unless the Department receives the co-operation of the farmers in trying to prevent the spread of East Coast Fever, the task would appear to be almost a hopeless one.

Horsesickness.—Three mules are reported to have died from this disease, probably contracted through workng in the Thorns.

Six mule wagons are now being run by the Department between Greytown and Muden, and as they have recently been doing three trips a week the accummulation of produce at Muden should soon be considerably lessened.

NEWCASTLE.—D.V.S. McNEIL.

Sheep Scab.—I am glad to say that there are no cases of Scab in the Newcastle district and only one continued outbreak is present in the Utrecht district.

Mange affecting Goats.—Seven licenses were raised during the month.

Glanders.—One animal was destroyed during the month. This case was continued from the previous month owing to the reaction not being decided in character.

Lungsickness.—One outbreak occurred during the month. An "old lunger" from a previous outbreak was the victim. I inspected the lung on *post-mortem*. The farm is in strict quarantine, and there have been no further deaths.

Contagious Pleuro-pneumonia of Goats.—During the past month an extensive outbreak of the above disease appeared in this district, happily confined to a single flock, and causing the death of eighty goats and kids.

This disease very much simulates Lungsickness affecting cattle in the general appearances of the animals during life and on *post-mortem* examination. As in the case of bovine pleuro-pneumonia, a certain proportion make a recovery, and the history of the outbreak leads me to infer that this outbreak was occasioned by the breaking down of an encapsuled previously diseased portion of lung tissue. Medicines are of no avail in the treatment of the disease; segregation of the diseased animals from the healthy gives good results.

MOOI RIVER.—D.V.S. VERNEY.

Horsesickness has occurred in the Weenen Division, two horses having succumbed from this malady. There is every prospect of a bad season in this respect.

East Coast Fever.—During the month no fresh outbreaks have occurred, although there had been several deaths amongst cattle in and near Muden, but the majority of these had been due to eating poison, such as young Amakla plants, etc. The main fencing of the infected area at Rottcher's is now completed, and it only remains to fence portions of the Mooi River that cattle could get through when the river is low. Grass is very bad at the Crown lands where cattle in temperature camp graze, the result of want of rain. Tick life is becoming very active in the thorn veld now, and I anticipate if there are any more infected areas we shall soon get evidence of them, and it is very important that stockowners should send slides from all animals sick or dead.

Biliary Fever.—An imported thoroughbred came under my treatment for Biliary Fever. This animal was in a very critical condition, but I am pleased to say he has made a good recovery.

DURBAN.—D.V.S. AMOS.

The importations by sea have been as follows:—

Sheep, 1,041 ewes, 130 rams	1,171
Mules	559
Donkeys	254
Horses	157
Dogs	21
Pigs	6
Rabbits	4
Deer	4
Goats	2
Total	2,178

All the sheep came from Australia. The mules, donkeys, and 41 horses came from Argentine. 106 horses came from Australia, and the remainder from England. The dogs and pigs came from England. The deer from India, and the goats from Cape Colony.

Horsesickness has been fairly prevalent, and some 19 cases have come to my notice.

East Coast Fever.—This disease has been held in check, and the four fresh outbreaks that occurred during the month were all well inside the infected area. Forty-two deaths took place from the disease, 36 were killed with high temperatures, and 164 were removed for slaughter purposes. Those who sold their cattle for slaughter within the area acted very wisely, and it is a great pity the scheme is not to be continuous, for it undoubtedly is the only chance of obtaining any finality with the disease, and the Colony would have been opened to free movement again all the sooner, which at present seems to be too far off to even think of. Many people still try to persuade themselves the disease is anything else but East Coast Fever, which is most extraordinary after the object lessons which anyone could see who wished to in more than one outbreak in this county. The special quarantined area is now well flagged and guarded, and I hope sincerely our efforts will keep the disease within it.

ALEXANDRA AND ALFRED.—D.V.S. TYLER.

East Coast Fever.—The outbreak of East Coast Fever in Alexandra County has been dealt with, and the cattle have been returned to their owners after passing through two test camps. The fence around the infected area is almost completed, and I do not think we need be afraid of any extension of the disease from this centre. The quarantine regulations are, of course, still being maintained, and are being loyally observed by the residents.

Horsesickness.—Several deaths have occurred from this disease, and there is every indication of a bad year before us.

Fruit Culture.

SPEECH BY THE MINISTER OF AGRICULTURE.

On the 19th inst., at the Annual Meeting of the Pinetown Horticultural Society, the Minister of Agriculture, in the course of a short speech, said that horticulture had now arrived at a very important stage in the Colony, inasmuch as they were now able to produce fruit more than enough for local requirements, while distant markets were practically unworked. It would interest those of them who were fruit-growers to know that the annual value of the Natal fruit crop was £150,000. That value could be exceeded by careful selection, and it was their duty to look into the matter very closely. They were aware that next month the South African Produce Exhibition would be opened in London, and at that Exhibition one of the most important exhibits would be from Natal. In fact, he might say that the Natal exhibit was between 60 and 70 tons measurement of pineapples, and each pineapple would weigh not less than 2℔., while the price would be such as to force a sale. He hoped the result of that would be that between Natal and London a trade in fruit would spring up, and that the culture of pineapples would be extended. The Government had, within the last few years, paid great attention to horticulture. It had experimental orchards at Cedara, Weenen, and Winkel Spruit. At Cedara, experiments were being carried out in the culture of up-country fruits, and there the methods adopted for cultivation, manuring, pruning, and the warring against insects had proved very successful. At Weenen they were also experimenting, and paying great attention to irrigation, and on the coast, at Winkel Spruit, all the varieties of coast fruits were being experimented with. At Winkel Spruit an addition had been made of the St. Michael pine, and also of a banana, which at the present time was creating a great deal of interest in London. The Government had on all occasions sent officers to the various fruit-growing centres to advise fruit-growers in all manner of things pertaining to fruit culture, and last year consignments of fruit were being collected and sent to London, free of cost, and won medals. That showed that their fruit was of good quality, and what they wished to arrive at now was to send fruit to the Home market, not in sample, but in bulk. A complaint which recently had become an actual grievance, was that the fruit was sent up-country in iron trucks. That grievance was now one of the past. At the show they naturally staged only the best fruit, and he hoped that they would bear that in mind when they were sending fruit to market, and send only the best quality for disposal. Let them get a good name from the start, for the smaller fruit could be used up as pulp or jam, for which also there was a big opening. In conclusion, he said that the show had been a surprise; he had expected a small show, and instead found a large one of excellent exhibits. He declared the show open.

District Report.

WEENEN, 20th January.—There has, unfortunately, been another outbreak of East Coast Fever at Muden, this time on the farm Sutherland. Seven head are reported to have died within the last three weeks, and the owners failed to report the matter. As this outbreak is within the previously proclaimed sub-quarantine area, it is hoped that it will be confined to this district. Locusts have been laying eggs throughout certain portions of the Division. A large number of eggs deposited on low-lying fields are reported to have been destroyed by Mr. Rottcher, who flooded the land for this purpose. Isolated cases of Horsesickness have occurred. A horse belonging to a local volunteer succumbed two days after it was insured. After a period of scorching sun for a few weeks, good rains have fallen, which will be the salvation of some of the crops. Fruit is backward this year, and the supply does not promise to be plentiful. C. G. Jackson, Magistrate.

Manures of 1906.

In the manure list given on pages 1,208 and 1,209 of last month's *Journal* an unfortunate error occurred with regard to No. 42 Potato Fertiliser sold by the South African Fertiliser Coy. The figures should read Nitrogen 4·05 per cent., instead of 3·75; the estimated value of the Nitrogen is £3 1s. 7d., and the total estimated value of the manure should read £7 3s. 8d., instead of £6 16s. 9d. In the list re-published in this issue the error has been corrected. A. PARDY, Analyst.

Manures on the Natal Market, 1906, with their Current Values and Prices.

NAME OF MANURE.	NITROGEN.		PHOSPHORIC ACID.								POTASH.		Estimated Value of Manure per Ton (2,000 lbs.) in Durban.	Price asked per Ton of 2,000 lbs. f.o.r. Durban.
			Water Soluble.		Citrate Soluble.		Citrate Insoluble.		TOTAL.					
	Per Cent.	Value in One Ton of Manure.	Per Cent.	Value in One Ton of Manure.	Per Cent.	Value in One Ton of Manure.	Per Cent.	Value in One Ton of Manure.	Per Cent.	Value in One Ton of Manure.	Per Cent.	Value in One Ton of Manure.		
Nitrogenous:		£ s. d.		£ s. d.		£ s. d.		£ s. d.		£ s. d.		£ s. d.	£ s. d.	£ s. d.
Sulphate of Ammonia	20·74	16 1 6	...	...	...	...	...	...	...	...	...	...	16 1 6	16 12 6*a*
do.	20·70	16 0 10	...	...	...	...	...	...	...	..	...	..	16 0 10	15 10 0*b*
Nitrate of Soda...	16·05	12 14 2	...	...	...	...	...	...	...	...	..	...	12 14 2	12 15 0*a*
do. ..	15·75	12 9 4	...	...	...	...	...	...	...	...	...	...	12 9 4	12 10 0*b*
Nitrate of Potash	13·44	10 12 10	...	...	...	...	...	...	...	...	44·45	12 4 6	22 17 4	21 0 0*b*
Mainly Phosphatic:														
Superphosphate (Double)	...	...	41.25	11 10 4	4·20	0 17 6	0·30	0 0 10	45·75	12 8 8	...	...	12 8 8	11 10 0*b*
do. do.	...	...	39·20	10 18 10	2·95	0 12 4	0·25	0 0 8	42·40	11 11 10	...	...	11 11 10	10 19 4*c*
do. do.	...	...	36·31	10 2 9	5·95	1 4 10	0·24	0 0 8	42·50	11 8 3	...	...	11 8 3	10 18 6*a*
do. High Grade	...	...	19·35	5 8 0	0·02	0 0 1	0·05	0 0 2	19·42	5 8 3		...	5 8 3	5 0 6*c*
do. do.	...	...	16·88	4 14 3	1·13	0 4 9	0·05	0 0 2	18·06	4 19 2	...	...	4 19 2	5 0 0*d*
do. do.	...	...	17·04	4 15 2	0·75	0 3 1	0·21	0 0 7	18·00	4 18 10	...	...	4 18 10	5 5 0*a*
do. do.	...	...	16·15	4 10 2	1·91	0 8 0	0·22	0 0 7	18·28	4 18 9	...	...	4 18 9	5 10 0*e*
do. Ordinary	...	...	15·90	4 8 9	0·83	0 3 6	0·12	0 0 4	16·85	4 12 7	...	...	4 12 7	5 5 0*b*
do. do.	...	..	15·64	4 7 4	0·50	0 2 1	0·06	0 0 2	16·20	4 9 7	...	..	4 9 7	4 15 0*e*
do. do.	...	...	13·56	3 15 9	1·88	0 7 10	0·26	0 0 8	15·70	4 4 3	...	...	4 4 3	4 7 6*a*
do. do.	...	...	12·51	3 9 10	1·35	0 5 8	0·04	0 0 2	13·90	3 15 8	...	...	3 15 8	3 10 0*f*
do. (Ammoniated)	1·00	0 15 6	8·12	2 5 4	4·78	0 19 11	1·05	0 2 11	13·95	3 8 2	...	...	4 3 8	5 10 0*g*
Pure Dissolved Bone ...	3·59	2 3 8	3·36	0 18 9	2·81	0 11 9	13·58	1 17 4	19·75	3 7 10	..	...	5 11 6	6 10 0*b*

											Fineness of Bone Dust and Slag per cent.				
Dissolved Bone Compound ...	1·30	0 15 10	10·05	2 16 1	4·29	0 17 11	2·61	0 7 2	16·95	4 1 2				4 17 0	6 0 0*b*
do. ...	1·40	0 17 1	12·10	3 7 7	0·75	0 3 2	2·30	0 6 4	15·15	3 17 1				4 14 2	5 17 6*a*
do. ...	0·78	0 9 8	12·00	3 7 0	0·27	0 1 2	0·92	0 2 6	13·19	3 10 8				4 0 4	6 0 0*c*
do. ...	1·30	0 15 6	9·21	2 11 5	1·68	0 7 0	3·26	0 9 0	14·15	3 7 5				4 2 11	6 0 0*g*
Steamed Bone											Fine.	Med.	Crse.		
flour	0 76	0 8 9	...	...	10·12	2 2 2	24·78	3 8 2	34·90	5 10 4	70·83	9·88	19·29	5 19 1	9 14 2*h*
do. ...	1·21	0 13 11	...	...	10·16	2 2 4	21·84	3 0 1	32·00	5 2 5	99·17	0·00	0·83	5 16 4	5 10 0*b*
do. ...	1·17	0 13 5	...	...	8·65	1 16 1	23·55	3 4 9	32·20	5 0 10	84·33	0·19	15·48	5 14 3	5 9 6*c*
Bone (Ground)	3·98	2 5 9	...	...	4·05	0 16 11	19·60	2 13 11	23·65	3 10 10	37·94	24·69	37·37	5 16 7	6 0 0*b*
do. do.	4·20	2 8 4	...	...	3·66	0 15 3	19·11	2 12 7	22·77	3 7 10	34·85	25·46	39·69	5 16 2	5 19 7*i*
do. do.	3·81	2 3 10	...	...	4·38	0 18 3	17·97	2 9 5	22·35	3 7 8	40·03	25.04	34.93	5 11 6	5 14 2*j*
do. do.	3·55	2 0 10	...	...	5·87	1 4 6	14·82	2 0 9	20·69	3 5 3	31·82	30·78	37·40	5 6 1	6 4 2*h*
Basic Slag S.A.F. Co.	...	...	...	...	13·13	3 5 8	7·23	1 7 1	20·36	4 12 9	Over 80 per ct. fine			4 12 9	4 10 0*b*
do. ...	...	...	..	...	12·10	3 0 6	6·05	1 2 8	18·15	4 3 2	,, 70 ,,			4 3 2	3 15 6*a*
do. ...	..	...	...	...	9·60	2 8 0	3·40	0 12 9	13·00	3 0 9	,, 75 ,,			3 0 9	3 16 0*e*
do. ...	...	...	...	...	4·15	1 0 9	9·11	1 14 2	13·26	2 14 11	,, 83 ,,			2 14 11	3 10 0*b*
Potassic:															
Chloride (Muriate) of Potash ...	...	...	...	...	...	...	...	...	...	...	58·58	13 13 4		13 13 4	13 10 0*b*
do ...	...	...	...	...	..	...	...	...	...	...	58·04	13 10 10		13 10 10	13 15 0*a*
Sulphate of Potash	...	...	...	...	...	...	...	...	...	...	49·37	13 11 6		13 11 6	13 15 0*a*
do.	...	...	...	...	...	...	...	...	...	...	45·72	12 11 6		12 11 6	13 10 0*b*
do.	...	...	...	...	...	...	...	...	...	...	39·56	10 17 7		10 17 7	11 0 0*b*
Nitrate of Potash	13·44	10 12 10	...	...	...	...	...	...	...	...	44·45	12 4 6		22 17 4	21 0 0*b*
Kainit	...	...	...	...	...	...	...	...	...	...	12·70	2 19 3		2 19 3	3 0 0*k*
Complete:															
Potato Fertilizer	3·77	2 18 9	12·21	3 8 1	0·35	0 1 6	0·04	0 0 1	12·60	3 9 8	3·69	0 17 3		7 5 8	7 15 0*a*
do.	4·84	3 15 0	8·11	2 5 3	3·10	0 12 11	0·57	0 1 7	11·78	2 19 9	2·73	0 15 0		7 9 .9	8 10 0*g*
do.	4·05	3 1 7	8·31	2 6 5	1·87	0 7 10	1·74	0 4 9	11·92	2 19 0	4·20	1 3 1		7 3 8	7 15 0*b*
do.	3·45	2 10 3	8·65	2 8 4	1·60	0 6 8	1·55	0 4 3	11·80	2 19 3	3·09	0 14 5		6 3 11	8 12 8*e*
Camp Refuse ..	0·43	0 4 11	...	...	0·47	0 2 0	0·10	0 0 3	0·57	0 2 3	0·35	0 1 8		0 8 10	...
Marvel Fertilizer	0·51	0 5 11	...	...	0·25	0 1 0	0·35	0 1 0	0·60	0 2 0	...	...		0 7 11	3 4 2*j*
E & O.E.															

a Henwood, Son, Soutter & Co. *b* South African Fertilizers Co. *c* F. and G. Reiche. *d* W. Dunn & Co. *e* J. Raw & Co. *f* Natal Chemical Syndicate, Ltd. *g* B. Westall & Co., Mooi River. *h* Geo. Telfer. *i* P. D. Clark, Mooi River. *j* H. C. Foss & Co. *k* Steel, Murray & Co.

Cedara, December, 1906.

ALEX. PARDY, F.C.S., &c., Analyst.

Meteorological Returns.

Meteorological Observations taken at Government Stations for Month of December, 1906.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.).				RAINFALL (IN INCHES).					
	Means for Month.		Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heav'st rainfall in 1 day.		Total for Year from July 1st, 1906.	Total for same per'd from July 1st, 1905.
	Maximum	Minimum					Fall.	Day.		
Observatory ..	81·5	66·0	89·3	60·3	6·96	19	2·12	29th	21·87	18·14
Stanger ..	85·0	64·8	108	54	4·24	23	2·25	14th	21·99	19·52
Verulam ..	91·0	66·6	105	60	3·36	10	1·50	14th	16·83	15·93
Greytown ..	87·2	48·3	100	36	3·05	13	·70	14th	14·61	15·73
Newcastle .	84·5	58·0	98	45	7·85	11	2·30	26th	23·74	14·54
Ndwedwe ..	78·9	62·7	92	56	4·60	15	1·35	15th	20·55	21·16
Estcourt ..	86·0	..	100	..	3·85	7	1·50	15th	11·86	9·86
Mid-Illovo ..	78·0	59·2	101	52	6·18	13	1·25	15th	20·63	14·25
Impendhle ..	75·3	50·7	85	41	4·13	17	1·14	28th	16·15	..
Port Shepstone ..	81·6	61·2	92	55	7·56	12	1·40	23rd	22·67	24·19
Umzinto ..	84·0	52·9	90	50	5·14	11	1·21	28th	23·37	20·69
Richmond ..	78·5	56·9	93	48	6·82	12	1·38	14th	19·68	17·21
Maritzburg ..	81·4	58·8	96	51	5·25	12	1·76	14th	21·22	13·05
Howick ..	79·4	55·7	92	47	3·78	14	1·71	14th	18·89	12·86
Dundee ..	80·7	60·7	92	52	5·40	14	1·41	16th	16·79	9·11
Weenen Gaol ..	94·9	59·5	102	52	1·60	10	·53	14th	11·47	12·85
Charlestown ..	76·5	50·0	84	35	8·40	17	3·84	29th	23·57	..
New Hanover ..	85·9	57·5	97	51	2·73	13	·90	14th	22·53	15·51
Nqutu ..	81·1	57·9	88	47	3·23	9	1·18	12th	..	11·09
Nongoma ..	79·9	49·5	89	39	6·18	8	1·40	25th	22·64	14·03
Umlalazi ..	85·5	49·4	100	35	6·0	8	2·30	13th	..	18·79
Hlabisa ..	80·5	59·8	96	50	6·08	6	2·00	26th	24·13	17·41
Melmoth ..	82·1	60·2	90	52	5·28	15	·91	16th	20·64	12·02
Ubombo ..	80·2	61·0	94	53	7·22	9	2·55	28th	27·90	..
Amatikulu ..	86·5	64·6	105	59	2·80	15	1·17	12th	15·91	..
Point	..	..	..	..	6·06	13	2·65	28th	22·63	18·38
Empangeni ..	..	..	..	..	3·50	7	1·11	27th	19·72	19·49
Maritzburg (Burger St.)	..	..	..	..	5·45	15	1·81	16th	20·71	..

Meteorological Observations taken at Private Stations for Month of December, 1907.

STATIONS.	TEMPERATURE (in Fahr. Degrees.)		RAINFALL (in inches).					
	Maximum for Month.	Minimum for Month.	Total for Month.	No. of days.	Heaviest Rainfall in one day.		Total for Year from July 1st, 1906.	Total for same period from July, 1905.
					Fall.	Day.		
Central Experiment Farm, Hill (Mangr.)	92	49	3·71	10	1·13	14th	18·54	10·60
Experiment Farm, Weenen (Manager) ..	99	48	2·02	9	·69	15th	12·32	10·96
Experiment Farm (Winkel Spruit) (Mgr.)	89	54	7·93	18	2·58	15th	22·77	22·84
Nottingham Road (C. J. King)	..	..	4·87	14	·75	14th	22·99	16·74
Adamshurst (Wm. Adams)	88	51	3·72	14	1·34	14th	15·93	9·88
Hilton (W. Engel)	88	46	3·90	16	1·83	14th	21·24	14·79
P.M.B., Town Bush Valley	..	..	5·85	14	1·75	14th	26·45	18·38
Mid-Illovo (A. N. Montgomery) ..	101	54	6·18	17	1·25	15th	20·63	14·25
Ottawa	..	..	3·99	12	1·18	15th	19·32	16·85
Mount Edgecombe (Natal Estates) ..	98	58	7·24	15	1·66	22nd	24·10	17·18
Cornubia (G. Wilkinson) ,, ..	..	..	8·27	..	..	..	26·13	15·29
Milkwood Kraal ,, ..	..	..	5·55	..	..	..	18·97	3·93
Blackburn ,, ..	..	..	5·62	..	..	..	19·17	13·17
Saccharine ,, ..	..	..	5·96	..	..	..	20·62	1·75
Equeefa (W. Hawksworth)	102	62	5·05	18	·78	15th	26·82	19·72
Umzinto, Beneva (E. W. Hawksworth) ..	..	..	4·97	12	0·85	14th	26·32	17·85
Branxholme (Charles Scott)	..	..	6·03	15	1·02	27th	31·11	19·09
Impendhle (H. Hill)	89	39	6·86	16	1·91	28th	22·45	17·26
Riet Vlei (P. Otto, J.P.)	..	..	3·40	13	·83	15th	13·93	..
Dalton (J. Pfotenhauer)	..	..	3·97	13	1·12	14th	17·27	..

Coal and Labour Return.

Return of Coal raised and Labour employed at the Natal Collieries for the month of December, 1906:—

Name of Colliery.	Labour Employed. Above Ground.			Below Ground.			Unproductive Work.*			Output.	
	E.	N.	I.	E.	N.	I.	E.	N.	I.	Tons.	Cwt.
Natal Navigation	29	81	258	19	251	186	4	9	—	16,2[illegible]8	5
Glencoe, Natal ..	20	120	89	14	498	7	—	—	—	16,261	15
Elandslaagte	18	22	240	16	230	450	10	28	34	14,842	17
Durban Navigation ..	19	149	59	12	308	52	—	10	—	12,411	—
South African	7	30	65	10	200	75	5	29	38	8,630	1
Natal Cambrian ..	16	33	120	12	200	71	—	—	—	7,254	15
Newcastle	10	40	25	9	289	3	3	6	—	7,133	6
Dundee Coal Co. ..	8	11	140	6	28	257	14	21	199	6,[illegible]95	3
St. George's	16	51	166	10	180	109	1	6	—	6,304	—
West Lennoxton ..	5	1	63	2	31	95	—	—	—	2,628	—
Natal Steam Coal ..	2	40	3	2	106	3	2	5	2	2,015	4
Ramsay	1	5	55	3	45	106	4	10	25	1,559	—
Talana (Natal) ..	3	8	12	1	30	32	2	3	3	1,264	5
Zululand	2	48	—	2	58	—	3	5	—	1,000	—
Woodlands	1	6	5	2	7	9	—	—	—	60	—
Signal Hill	—	—	—	—	—	—	1	3	—	32	—
Nooitgedacht	—	2	—	1	2	—	—	—	—	6	—
Totals	157	647	1,300	121	2,463	1,455	49	135	301	104,571	11
Corresponding month, '05	136	565	976	115	1,920	1,237	45	214	181	88,944	14

* Cost charged to Capital Account.

Maritzburg,
7th January, 1907.

CHAS. J. GRAY,
Commissioner of Mines.

Return of Coal bunkered and exported from the Port of Durban for the month of December, 1906:—

	Tons.	Cwt.
Coal Bunkered	38,965	5
Exported to:—		
Port St. John's	8	0
East London	1,491	2
Algoa Bay	4,942	19
Mossel Bay	10	0
Cape Town	18,824	6
Port Pirie	1,004	10
Mauritius	115	5
Total	65,361	7

(Signed) GEO. MAYSTON,
Collector of Customs.

Custom House, Port Natal,
5th January, 1907.

A good harness wax can be made with the following ingredients: Turpentine oil, 900 parts; yellow wax, 90 parts; Prussian blue, 10 parts; indigo, 5 parts; bone black, 50 parts. Dissolve the wax in the oil by the aid of a low heat in a water bath. Mix the remaining ingredients, which must be well powdered, and work up with a portion of the solution of wax. Finally add the mixture to the solution, and mix thoroughly in the bath. When a homogeneous liquid is got, pour into earthern boxes.

Return of Farms at Present under Licence for Lungsickness and Scab.

Stock Inspector.	District.	Disease.	Owner.	Farm.
A. H. Ball ..	Weenen	Scab	J. P. Lotter ..	Berg Vl it
		,,	Gundane	Gretua Green
		,,	Inkinshi & Others..	Bell Vue
A. P. Craw .	Ladysmith ..	,,	A. W. Illing ..	Minita s
		,,	Gengen	Roodeport
L. Trenor ..	Harding	,,	Maholua	,,
J. R. Cooper ..	Nkandhla & Nqutu	,,	M. Modweni ..	Dalalu
		,,	B. Butelezi ..	,,
		,,	B. Ndhlovu ..	,,
		,,	M. Ndhlovu ..	,,
		,,	C. Sekosana ..	,,
		Lungsickness	N. Gobose ..	Malogato
		Scab	M. Gobose ..	Lower Blood River
		,,	S. Zungu ..	Delala
		,,	S. O. Molife ..	Telezi
		,,	D. Ndhlovu ..	,,
		,,	M. Setole ..	Delala
		,,	M. Mgune ..	Blood River
		Lungsickness	S. Sebese ..	Nqutu Hill
S. A. Brown ..	Underberg ..	Scab	J. A. Stone ..	
		,,	T. de C. Arbuckle..	Kerridge
		,,	B. Phipson ..	Strathcampbell
		,,	M. Fraser ..	Winterhoek
		,,	R. C. Gold ..	Woo end
		,,	J. R Royston ..	Greenend
		,,	J. van Whye ..	Silburn
H. van Rooyen ..	Vryheid	,,	Jonas	Witpoort
		,,	Mjebe	Fresgewacht
		,,	Machaba	Rooipoort
		,,	Mgeslo & Co. ..	Hardscamp
A. B. Koe ..	Portion of Estcourt	,,	J. W. Moor ..	Moorleigh
A. J. Marshall ..	Dundee	,,	R. J. du Bois ..	Giba
		,,	J. W, de Bruyn ..	Rooifontein
		,,	C. M. Vermaak ..	Paddock
		,,	L. W. Meyer ..	Langverwacht
		,,	A. L. Jansen ..	Strathearn
		,,	J. O. Nel ..	Earnscliffe
		,,	A. C. Vermaak ..	Sigtuna
		,,	T. C. Vermaak ..	Harriotdale
		,,	H. Vermaak ..	Paddock
		Lungsickness	Govt. Loot Stock ..	Goodekeus
E. Varty ..	Western Umvoti ..	,,	T. J. Nel ..	Mt. Eruestina
J. J. Hodson ..	Ptn of Lion's River	,,	A. K. Murray ..	Shawlands
		,,	Mrs Vear	Brookdale
R. W. Stratford ..	Newcastle ..	Lungsickness	H. Kumalo ..	Mossondale
R. Mayne ..	Krantzkop ..	Scab	W. W. Mare ..	Doomhoek
		Lungsickness	P. R. Nell ..	Broeder's Hoek
G. Daniell ..	Vryheid ..	Scab	J. R. Steenkamp ..	Bloemhof
		,,	G. Combrink ..	Goedehoop
		,,	D. Coetzee ..	Rustplaats
R. Mayne ..	Eastern Umvoti ..	,,	J. T. Nel ..	Craiglands
		,,	P. R. Botha ..	Olivefontein
		,,	do. ..	Mountain View
		,,	J. J. Bronkhorst ..	Vlak Vlak Vlakte
		,,	Mtwali	Olivefontein
		,,	Haleni ..	Olivefontein
		,,	J. J. van Rooyen ..	Overvleit
		,,	Mtshugongulu ..	Olivefontein
		,,	S. C. van Rooyen ..	Small Hoek
		,,	S. W. Cadle ..	Fairfield
A. Hair ..	City and Umgeni ..	,,	Nombeyangene ..	Zwaartkop Location
J. Button	Portion of Estcourt	,,	G. Ross	Roslin
		Lungsickness	J. Bird	,,
A. S. Parkinson ..	New Hanover ..	Scab	Swaiman	Location

MANGE IN HORSES EXISTS AS UNDER.

Name.	District.	Name.	District.
W. E. Oates	Bergville	A. G. Stafford.. ..	Harding
H. Turner	Lidgetton	Cazindhleli	Nqutu
A. M. Campbell ..	,,	C. Harding	Weenen
Mboyea	Bergville.	R. Thompaon	New Leeds

EPIZOOTIC LYMPHANGITIS EXISTS AS UNDER.

Name.	District.	Name.	District.
Horses and Mules of Natal Estate Co.	Mt. Edgecumbe	Horses of H. Michaux ..	Durban
Mules of B. Caswell ..	Umgeni	Horses of Johnstone & Bates	,,
Mules of Rancomar ..	do.	Horses of Parker, Wood & Co.	,,
Horses of Beningfield ..	Durban	Horses of Shire & Co. ..	,,
Horses of Durban Corpn.	,,	Mule of J. D. Caldwell ..	,,
Horses of Cornelius & Holt	,,		
Horse of Mr. Bradley ..	,,		

Principal Veterinary Surgeon's Office,
22nd January, 1907.

M. J. HIME,
for P. V. Surgeon.

East Coast Fever Notice.

The Minister of Agriculture has been advised by the Transvaal Department of Agriculture that no more slaughter cattle will be allowed to enter the Transvaal from Natal, save and except those for whose admission permits have already been issued.

Market Reports.

(Responsibility for the accuracy of the Statements and Opinions of the following Reports rests with the respective Contributors.)

MARITZBURG.—Messrs. W. H. Walker & Co. write: It is many years since Maritzburg and the neighbourhood have experienced such a continuous rainfall as that of the last 14 days. Some farmers state that they have had none too much, whilst others assert that it is impossible to get on to the land to work. Unfortunately trade does not show any inclination towards improvement, and prices, all round, are practically the same as those recorded for some months past.

Mealies.—Mealies are now becoming scarce, and prices have fluctuated between 14s. 4d. to 15s. 6d. per muid on the market; but as only small lots have come forward these figures do not show a fair reflex of what prices really are, as mealies are purchased at a much lower rate.

Forage.—Some good samples forward, prices realised being from 4s. to 4s. 9d. per 100 lbs.

Hay.—Owing to rain the market has been scantily supplied, and prices have fluctuated between 1s. 3d. and 2s. 9d. per bale.

Kafir Corn.—Fair supply offered at 6s. 6d. to 7s. per 100 lbs.

Potatoes.—Market well supplied with good tubers at 4s. to 6s. 6d. per 100 lbs; Sweet potatoes, 3s. 6d. to 4s. per sack.

Beans.—From 12s. 6d. to 15s. per 100 lbs.

Peas.—A few lots on offering realising from 6s. 6d. to 15s. 6d. per 100 lbs.

Poultry,—Common fowls have realised from 1s. 2d. to 2s. 9d. each. Market has been very indifferently supplied for some weeks past. Ducks, 8s. 3d. per pair.

Eggs.—Prices are firmer of late; from 1s. 4d. to 2s. 6d. per doz.

Butter.—Fresh butter from 11d. to 1s. 5d. per lb.; salt butter, 6d. to 10d. per lb.

Sunflower Seeds.—From 8s. to 8s. 3d. per 100 lbs.

Onions—From 3s. 9d. to 6s. 3d per 100 lbs.

Sundries.—Beef, 1d. to 7d. per lb.; salt beef, 4½d. to 5d. per lb.; mutton, 4½d. to 8d. per lb.; pork, 3d. to 6½d. per lb.; bacon, 2d. to 6d. per lb.; ham, 9d. per lb.; pigeons, 10d. to 1s. 1d. per pair.

Vegetables. —Market abundantly supplied with beans, beetroot, bringalls, cabbages. carrots, cucumbers, eschalots, lettuce, marrows. peas, green mealies, radishes and tomatoes.

Fruit.—Apples, bananas, grenadillas, grapes, mangoes, and pineapples.

Firewood.—Poles, from 5½d. to 7d. per 100 lbs.; cut wood, 7½d. to 8d. per 100lbs.

DURBAN.—Bananas, 1s. to 1s. 6d. per bunch; bananas, 6d. to 1s. 3d. per 100; beans, 3d. per lot; butter (fresh), 10d. to 1s. 2d. per lb.; cabbages, 6d. to 2s. per doz.; eggs, 1s. 9d. to 2s. 6d. per doz.; fowls, 1s. to 4s. each; lemons, 2s. to 4s. per case; lettuces, 3d, per doz.; mangoes, 2s. to 5s. per 100; papaws, 6d. to 1s. per doz.; peas (green) 6d. per basket; pigeons, 7d. to 1s. each; pineapples, 6d. to 1s. 6d. per doz.; potatoes, 5s. 6d. to 9s. per muid; tomatoes, 1s. to 2s. per case.

JOHANNESBURG.—Messrs. Abinger Keeling & Co., P.O. Box, 564, on the 18th report:—Forage, best dry, 6s. 3d. to 7s. per 100 lbs.; forage, good and new, 5s. 6d. to 6s. per 100 lbs.; forage, medium, 4s. 6d. to 5s. 3d. per 100 lbs.; lucerne, 5s. to 5s. 9d. per 100 lb.; kafir corn, sound red, 13s. 9d. to 14s. 9d. per 203 lbs.; kafir corn, white and mixed, 2s. 6d. to 13s. 3d. per 203 lbs.; mealies, good Hickory, 13s. 9d. to 14s. 3d. per 203 lbs.; mealies, white, 13s. 6d. to 14s. per 203 lbs.; mealies, mixed and yellow, 13s. 3d. to 14s. per 203 lbs.; potatoes, 2s. to 8s. per 163 lbs.; vegetables, fresh, 1s. 3d. to 3s. bag; eggs, newlaid, 2s. to 2s. 9d. doz.; eggs, colonial, 1s. 7d. to 1s. 11d. doz.; butter, 9d. to 1s. 1d. per lb.

Live Stock.—Slaughter oxen, 6-700 lbs., £12 to £14 10s.; trek, £9 to £11; sheep (Merinos) 23s. 6d. to 27s. 6d.; Capes, 21s. to 26s.; lambs, 15s. to 20s.; Pigs, 4d. to 4½d per lb. live weight. Market overstocked with oxen, and prices easier. Good demand for sheep.

Mealies and Kafir Corn.—There is no change in prices to report on the morning market, which, generally speaking, is firm. Wholesale values have been steadily based on a average of the morning market. Small parcels which have been constantly coming forward for sale there have to a very great extent stopped. Failing continuous supplies to the morning market, values, generally speaking, improve for parcels. Really good whites are scarce and in very good demand; supplies of mixed and yellow have been equal to demand.

Forage.—Very considerable supplies have come forward to the morning market, and prices have been fairly steady. Except for specially good white, which realised as much as 7s. 3d. per 100 lbs., values have averaged 5s. 6d. for good clean new forage.

Potatoes.—Market has been very heavily over-supplied, consequently there has been very little demand for anything but choice tables.

Pound Notices.

The following cattle in the undermentioned Pounds will be sold on the 20th February next, unless previously released:—

Good Luck—Bay filly, no brands or marks, long mane and tail.

Mountain View—Bay mare, about 12 hands, aged, star on forehead, halter on, badly cut with knee halter, branded like R.R. (the last R raised) on off shoulder.

Umsinga—Black gelding, 14.1, aged, hollow back, star on forehead, slit in right ear, no brands.

Colenso—Red cow, branded, looks like F turned round, on near hip, two pieces out of right ear, one out of left, long tail; with red heifer calf, not branded nor marked.

To be sold on the 6th March next—

Nqutu—Two goats, both brown and white, no particular marks. On Archdeacon Johnson's land at St. Augustine's—Mule, brown, branded W.L. near hind quarter and J 3 on neck, circle with five points (or star) on off hind quarter.

Finchley—Chestnut filly, small star, light patch on off hip, near hind fetlock white, tail cut square, has small piece of thin rope on neck, found at Mbuzo's Kraal, No. 3 Location, by Natal Police, Riverside.

Weenen—Black she goat, two nicks right ear. Black mule, mare, brown nose, branded O 961 right side of neck, V left side of neck, harness marked.

Hope Farm—Grey gelding, long mane and tail, brand indistinct, looks like W, on near hip, aged, about 14.2 hands, no ear marks.

Utrecht—Four mixed kafir sheep.

Krantzkop—Black cow, branded C.N. on right side, about six years old. On the farm Broedershoek—Red cow, no brands, with black bull calf, also no brands.

Howick—Red and white cow, left horn broken, aged, branded M on right hip. Red and white yearling heifer. The above described animals have been running on the Howick Commonage for twelve months.

Acton Homes—Eleven mixed kafir goats.

Impendhle—White ewe goat, tip of left ear cut off ; and kid.

Dundee—On the farm "Sheepridge,"—Dark bay filly, age about 3 years, about 13.3, white star, long mane and tail, branded M or JM (joined) near quarter. Reported by Mr. A Jansen, Sheepridge, Dundee.

Regina Farm, Division of Umzinto—Cow, young, black and white. Bull calf, white, with black spots. Bull calf, slate.

Heifer calf, red, with few white marks on face and chest.

Ladysmith—Bay mare, star on forehead, near hind foot white, about 13½ hands high, white mark on near fore fetlock, as if from reim, no brands visible.

Boston—Black ox, age about 3 years, brand indistinct, looks like **Ma.** Bay mare, age about 4 years, height about 13.1, off ear nicked.

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ZULULAND COAST FARMERS' ASSOCIATION.—President : G. H. Hulett ; Vice-President : C. Hill ; Hon. Secretary and Treasurer : F. Brammage, Ginginhlovu.

(*The Editor will be obliged if the Hon. Secretaries will supply him with lists of the Executives of their Associations.*)

Central Experiment Farm, Cedara.

In order to minimise interference with the general course of work on the Central Experiment Farm, Cedara, it has been found necessary to set apart two days of the week, namely, Tuesdays and Fridays, as visitors' days.

Arrangements will accordingly be made on those days for receiving visitors and showing them round the Farm. A trap will be at Cedara Station to meet the up 9.50 a.m. train; and if intending visitors from up-country will give notice to the guard at Howick Station, on their way down, a trap will be sent to meet the train which passes through Cedara at 11.2 a.m. Visitors travelling by other trains will also be met if they will previously make arrangements by writing.

On other than visitors' days visitors may be received by appointment, but special attention cannot be guaranteed in regard to their being shown round.

At least fourteen days' clear notice must be given by associations so that there may be time to make all necessary arrangements.

W. F. CLAYTON,
Minister of Agriculture.

Model Rules for Agricultural Co-Operative Societies.

The Department of Agriculture has for disposal, at the rate of one shilling each, copies of Model Rules for the use of Agricultural Co-operative Societies. Applications should be made to the Secretary, Minister of Agriculture, Pietermaritzburg.

Employment Bureau.

THE Department of Agriculture has received applications from the undermentioned, who are prepared to become assistants or apprentices on farms. The Department will be glad to hear from farmers willing to take young men as assistants, and to place them in correspondence with the various applicants. When communicating on the subject, farmers may refer to the applicants by quoting the numbers in the following list:—

No. 90.—22 years of age, active and not afraid of work, desires situation on farm where he can acquire knowledge of farming, small remuneration with board and lodging equired.

No. 91a.—Scotchman, 40 years of age, single, who has had lifelong experience of stock and agricultural farming in Scotland. Has been three years in South Africa. Produces good references. Is of respectable and intelligent appearance. Seeks managership or assistant managership of farm, if possible. Salary not of first importance.

No. 92a.—Englishman, 50 years of age, with varied experience in tea and coffee planting in Ceylon, and also of contract work. Has also been on a Sugar Estate, and has had experience in pig rearing. Salary needed.

Trees for Sale.

To encourage tree-planting, transplants and seeds of forest trees are supplied by Government, so far as in stock, at the undermentioned rates, exclusive of carriage, from the Government Nursery, Central Experimental Farm, Cedara.

Transplants of Eucalyptus, Pines, Acacias, Casuarinas, Cupressus, etc., about 25 trees in each tin, at 8s. 4d. per 100 trees. Trees in separate tins at 1s. each.

Transplants of scarce kinds, larger trees, or surplus stock, when available, will be charged at special rates, which will be furnished on application.

Tree seeds, in variety, at 1s. per packet. Price per pound, which fluctuates, will be furnished on application.

Package and postage of seed, when required, charged 1s. per lb. extra.

Orders for present or spring delivery should be addressed to the **Forester, Cedara,** and must be accompanied by a remittance in cash or postal order. Cheques cannot be accepted.

T. R. SIM,
Conservator of Forests.

Bulletins Issued by the Dept. of Agriculture.

Single copies may be obtained free (excepting those with price attached) on application to the Secretary, Minister of Agriculture.

No.

1.—"Notes on Fruit Culture," by Claude Fuller. [1902]. *(Out of print).*
2.—"Manures on the Natal Market, 1902," by A Pardy. [1902].
3.—"Insects in an Important Rôle," by Claude Fuller. [1904]. *(Out of Print).*
4.—"Manures on the Natal Market, 1903," by A. Pardy. [1903].
5.—"Weed Circular," by Claude Fuller. [1905].
6.—"Manures on the Natal Market, 1904," by A. Pardy. [1904].
7.—"Tree-planting in Natal," by T. R. Sim. [1905]. *(Price 2s. 6d.)*
8.—"Agricultural Co-operation," by E. T. Mullens. [1905].
9.—"Potato Culture," by A. N. Pearson. [1905].
10.—"Manures on Natal Market, 1905," by A. Pardy. [1905].
11.—"East Coast Fever," by S. B. Woollatt. [1906].
12.—"Manures on Natal Market, 1906," by A. Pardy. [1906]. *(In the Press).*
"Agricultural Statistics, Natal, 1904-5." [1906].

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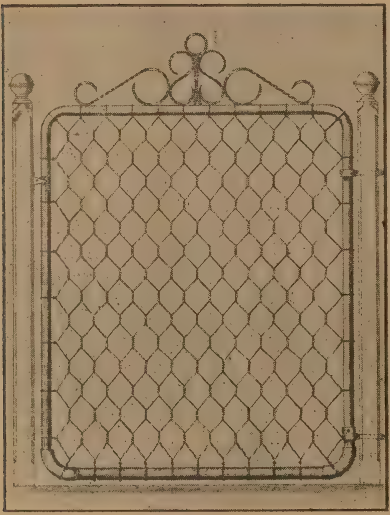

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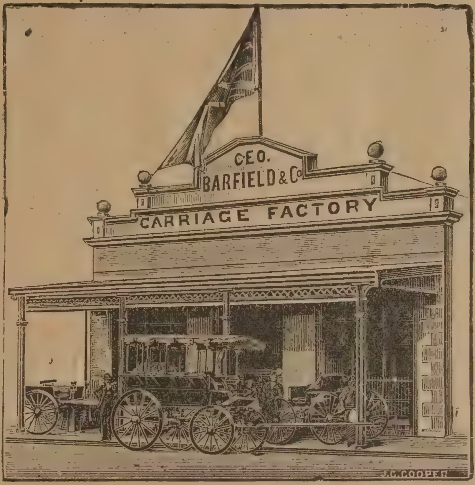

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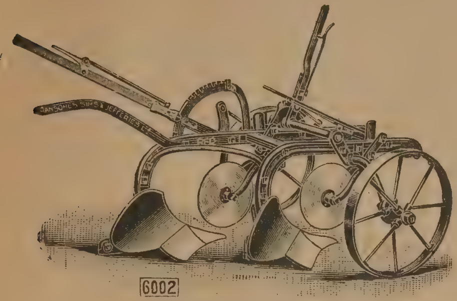

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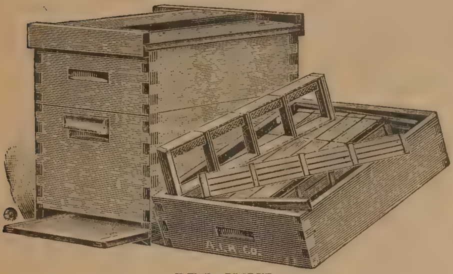

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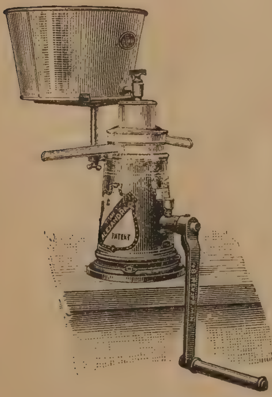

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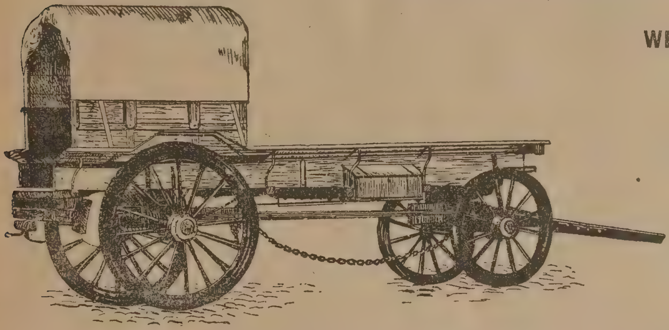

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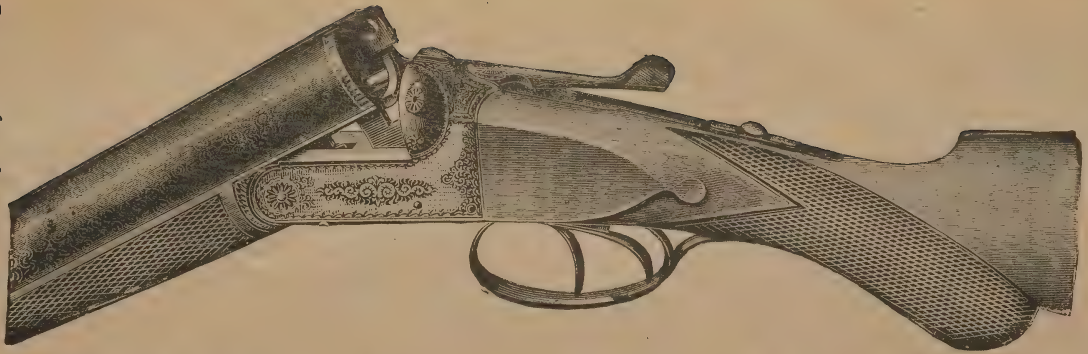

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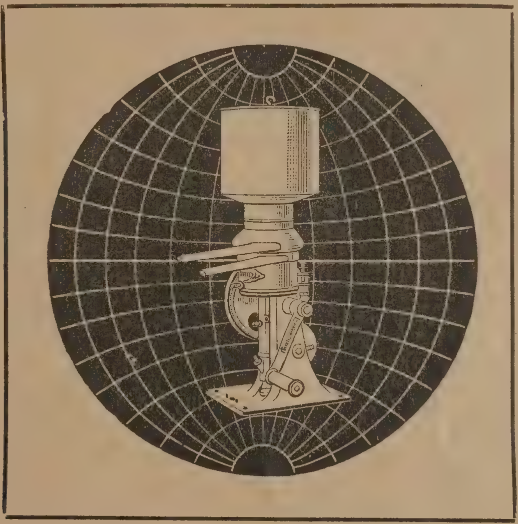

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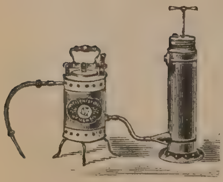

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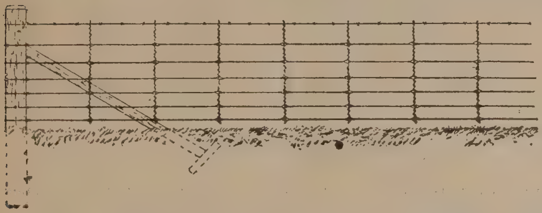

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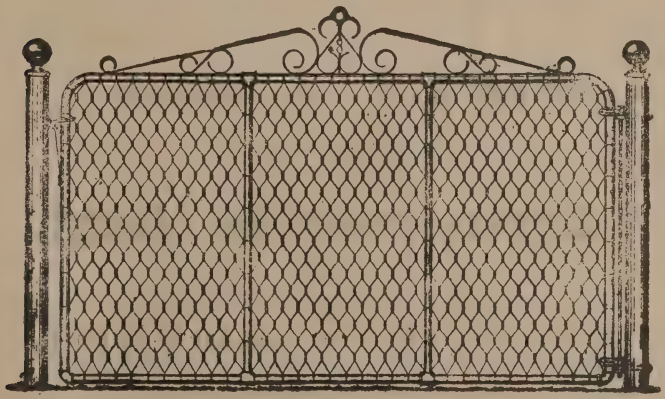

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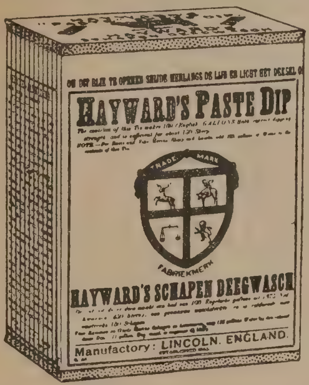
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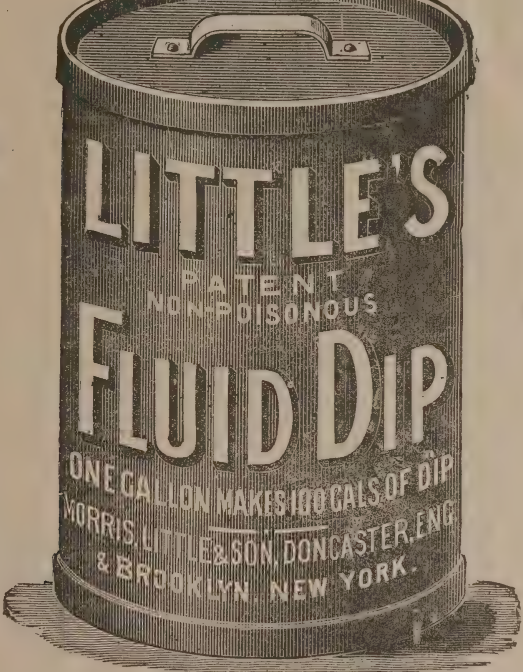
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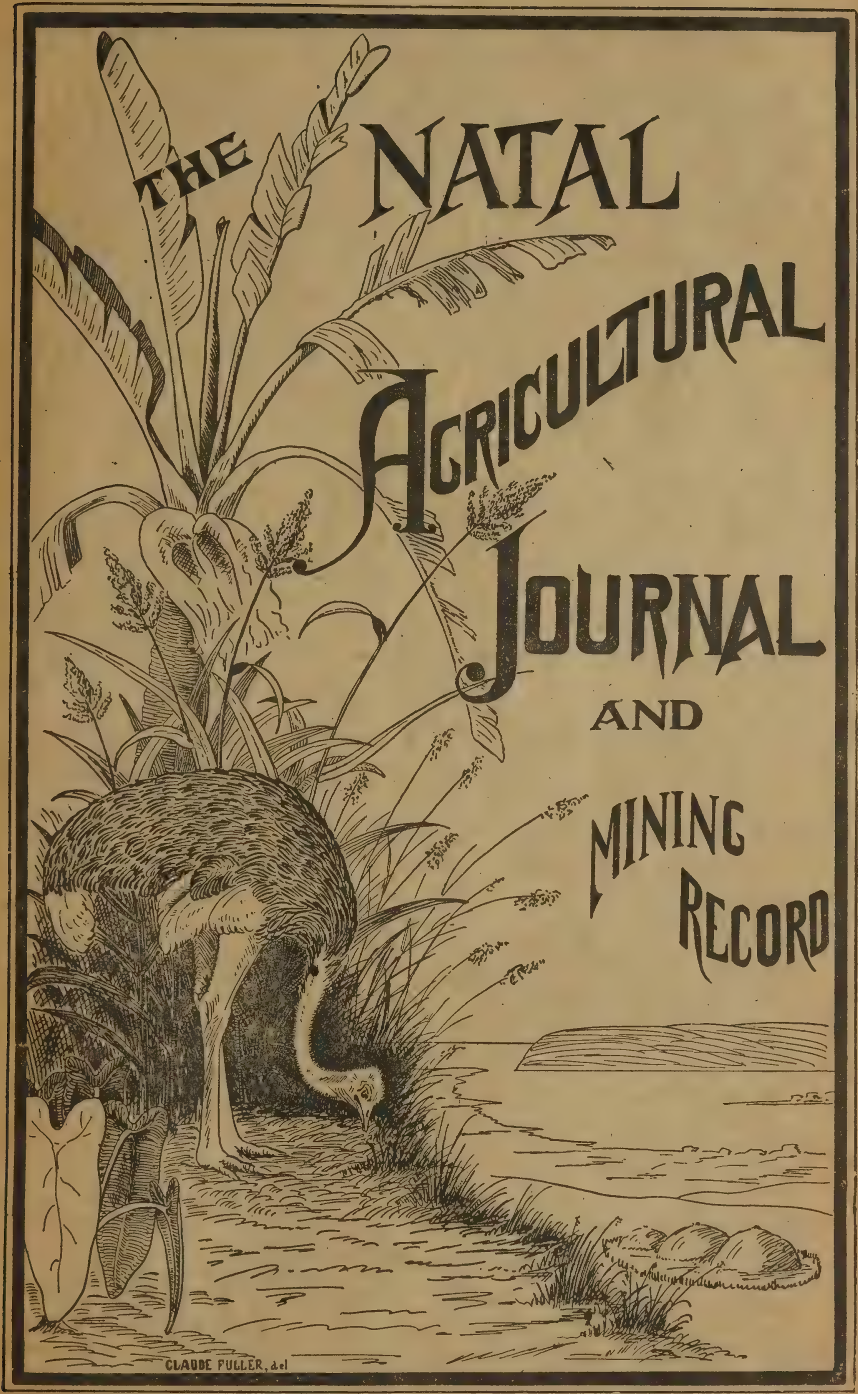
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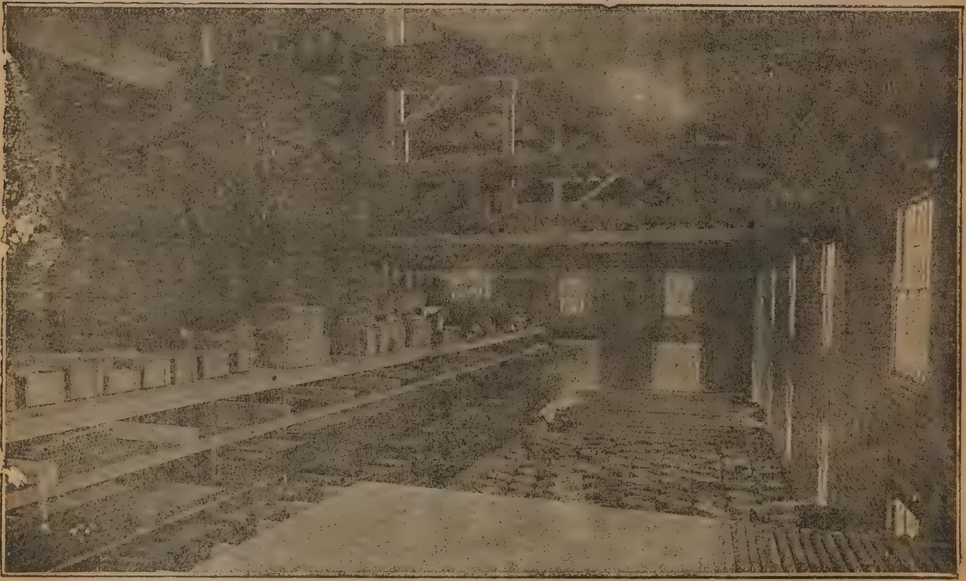

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Vol. X., No. 3. *MARCH 22, 1907.*

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NATAL AGRICULTURAL JOURNAL

AND

MINING RECORD.

EDITOR, H. RYLE SHAW.

Published for the Department of Agriculture

Publishers:
THE "TIMES" PRINTING AND PUBLISHING COMPANY, LIMITED.

1907.

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Vol. X. No. 3. MARCH 22, 1907.

Natal Agricultural Journal and Mining Record.

Bowel Lesions in the Horse due to a Strongylus.

A. J. Beckett, M.R.C.V.S.

During the past month several fatal cases of Enteritis (inflammation of the bowel), due to this parasite, have come under my notice. As the worm is minute it may easily be overlooked on casual examination, and death consequently attributed to other agents, such as "Bots," which have nothing whatever to do with the disease in question. Bots, in my experience, rarely, if ever, produce serious lesions, and are present in practically every horse that has been exposed to the attack of the fly (*Gastrophilus Equi.*) As, however, they are readily recognised, careless observers give them credit for many morbid conditions. A few notes calling the attention of horse and mule owners to this disease may therefore not be out of place.

The parasite worm in question is a small thread-like body, varying in length in the Strongylus Armatus between ½ inch and ¾ inch, and in the Tetracanthus from 1-3rd inch to ½ inch. The colour varies slightly, but is generally of a greyish-brown, and may be tinged with red. These worms are usually found in the large bowel, and when present are frequently in immense numbers. Over 1,000 have been counted by Chaubert on a bowel surface of two inches, and it was estimated that this horse contained 1,000,000.

The parasite does not appear to be confined to any particular country or climate, being found throughout the Continent of Europe and in the British Isles. Unless carefully looked for, the worms will not be discovered on *post-mortem* examination, but when present in any number they may be readily recognised as small thread-like bodies adhering to the inner coat of the bowel. They may also be seen, if detached, lying on the bowel contents, and movement there can generally be detected. A careful examination will often reveal small tumours in the bowel wall; these are caused by the encysted parasite at one stage of its existence. The arteries supplying blood to the bowel (mesenteric) may also be affected at certain stages, and tumours may be formed in their walls by the parasites, causing blood clot and partial or complete plugging, and as a consequence interference with the local blood supply and bowel nutrition.

If a portion of the intestine containing these worms be excised, rinsed, and held up to the light, numbers of the parasites will be seen adhering to the inner surface. The bowel itself will usually show small, red, puncture-like marks. These are due to the irritation produced by the hooked head of the parasite, by means of which it maintains its position.

If advanced inflammation is present the bowel will be partially or wholly of a deep red colour, and may be much increased in thickness owing to inflammatory eudate thrown out between its coats (outer and inner surfaces). A careful search may show the bowel arteries affected in the manner before described. In one case that has recently come under my notice severe Enteritis was seen, and there were several perforations from rupture of the tumours in the intestinal walls. As a consequence "Peritonitis" (inflammation of the covering of the abdominal walls) was present. This in cases of the kind is a possible sequel, but as a rule uncomplicated Enteritis is the symptom noted on examination after death.

The symptoms during life are vague, and are not, so far as I can learn, of a characteristic nature. Debility, colicy symptoms, and in some instances chronic bowel derangement, with a tendency to diarrhoea, may be observed. On the other hand, in recent cases coming under my notice all these symptoms were absent, and the animals were in good condition, showing no signs of bowel trouble until enteric symptoms set in.

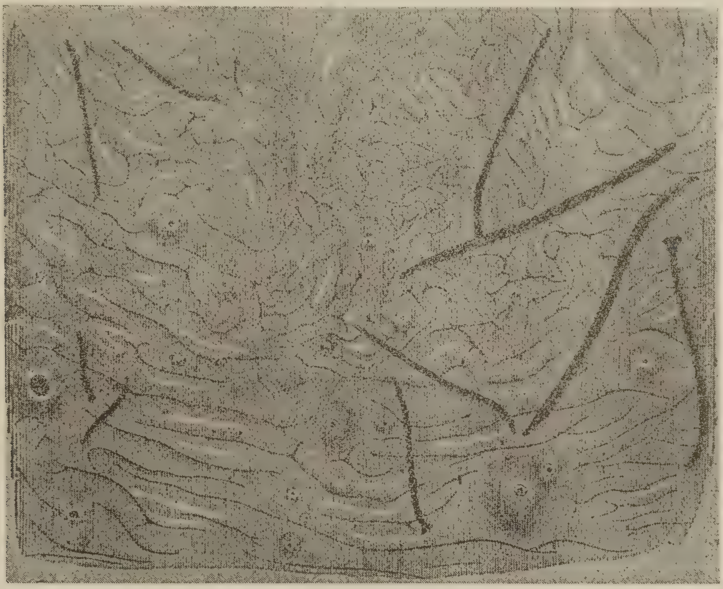
When colic or enteritis has appeared, no distinguishing feature can be named which will differentiate these cases from simple colic or enteritis.

At times a positive diagnosis may be obtained by manual exploration of the rectum, as the worms may possibly be found adhering to the arm or on the dung removed. This, however, is anything but an infallible test, and should not be relied on if it prove negative. It therefore frequently happens that no positive diagnosis can be made unless death occurs and a *post-mortem* examination offers.

It will not be necessary to emphasize the usefulness of a *post-mortem* examination in these cases, it should at once call attention to the fact of the parasite's presence on a farm or locality, thus enabling an owner to take proper precautions to avoid further loss. Should a similar case occur later, information has been gained which will prove of the utmost value in treatment; and more important still, it affords an opportunity of immediate preventive treatment amongst other animals which have been exposed to the same chances of contagion.

It is most essential after making a *post-mortem* examination that the ground be thoroughly disinfected, and a strong disinfectant should be freely used over the entrails and bowel contents before burning or burying them. Precautions of this kind are necessary to check the spread of all parasite diseases, as the eggs if not destroyed will be the means of a fresh outbreak.

It seems probable that water and green forage are the usual vehicle of contagion in this particular instance, therefore any trouble taken to avoid this contamination will be amply repaid.



SCLEROSTOMES ON PIECE OF BOWEL.
(After Railliet.)

As regards treatment, if a correct diagnosis can be made rational treatment may be carried out with hope of success, provided marked inflammatory symptoms are absent.

Enteritis, when once established, is a very serious lesion in the horse, and often proves rapidly fatal.

If, however, an animal is taken in an early stage, before bowel inflammation has made its appearance, a regular course of worm medicine is indicated, and should be persisted in for a considerable time, at short intervals, and followed by a dose of oil or physic. Violent remedies, or irritant medicines, are counter-indicated, owing to the irritable state of the intestinal mucous membrane, which is not in a condition to bear drastic measures. The object in view, to kill and expel the worms, and in doing so to avoid anything likely to produce or increase bowel irritation or inflammation, must be borne in mind if success in treatment is looked for.

It will be observed that stress is laid on prevention. As a matter of fact preventive measures promise most success, and their importance cannot be overestimated once this parasite has been proved to exist in a troop or on a farm. Any inattention to this detail may result in a serious outbreak and heavy loss.

As an animal harbouring parasites of this nature is simply a breeding ground from which they disseminate, the infection of others in contact follows as a natural course, provided that the conditions are favourable to parasite life and growth.

It is not intended to convey the idea that all horses harbouring these parasites will necessarily suffer from serious bowel derangement, but their presence cannot be beneficial, and if in numbers must be a constant menace to health. The natural healthy tone and function of the bowel must be more or less interfered with, and as a consequence its vitality lowered, and predisposition to intestinal disease increased.

The attached illustration, taken from "Neumann's Parasites," will convey some idea of the actual parasite on the bowel surface as generally seen in the fully developed stage. The asexual or immature parasite is more minute and requires careful observation to localise.

Short Notes.

FOURCROYA GIGANTEA.—There are a good many plants of *Fourcroya gigantea*, the commercial aloe of Mauritius, to be found in and about Maritzburg, but they are often unrecognised even by the owners of the land on which they are growing. There is a particular plant in a position easily accessible to all; namely, close to and almost touching the nearest bridge to the Botanical Gardens from the tramway terminus. The bridge is of the "rustic" order.

CHEAP LABOUR.—Not for many years has native labour been so abundant in the Colony. In the towns and in the country boys are constantly asking for work. In Durban there are many hundreds of time-expired Indians wanting work; according to law, no one may employ these Indians if they are not in possession of receipts for their annual £3 license. Many of these time-expired Indians do not hold such receipts, and they do not easily find employers speculative enough to advance the arrears. In Maritzburg and probably Durban the shrinkage of natives in employment is a trouble to the butchers; butchers depend largely upon natives as purchasers of the inferior meat belonging to every carcase.

LUCERNE.—Lucerne growers in America state that in a dry spell, just after the lucerne has been cut and stooked, it pays well to disc the land both ways, then harrow smooth. In this way they have increased the yield by 25 and 54 per cent. This applies to alfalfa three or more years old. Some, however, have disced it when only two years old, and report good results. They use a sharp level harrow at this stage of its development. In a thin stand the disc may be set at a sharp angle, with a thick stand at a less angle. Set the discs to a good depth, so as to cut through the crust formed and turn the soil well over. Besides thickening the stand of alfalfa, hastening its growth, and conserving the moisture, much good will be done by eradicating weeds. For best results, and to make it easier for the team, the discs should be sharp. Repeat the discing after each successive cutting.

SWING-PLOUGHS.—In his "interview" with Mr. Wm. Taylor, Ergates referred to a swing-plough which Mr. Taylor brought to the Colony many years ago. The following extract from a report of the American Consul at Edinburgh will be read with interest:—"It is curious to note a tendency among farmers in certain sections to go back to the old Scotch 'swing' plough. A prominent dealer in agricultural implements states that many ploughmen take pride in their expertness, and, as 'anybody can manage a beam which runs on a wheel,' they have a fancy for the old and more difficult type of plough. This probably explains the occasional calls for these out-of-date implements." If the Colony should ever possess a museum of agricultural implements and appliances, it is to be hoped that the ancient plough belonging to Mr. Taylor—the kind of plough which Robert Burns worked with—will be found among the exhibits.

THE RAINFALL.—A glance at the meteorological returns will show an immense improvement in the rainfall for the present year compared with that of last year. When the year—the weather year—ends, the improvement is bound to be even more striking. Some of the returns now published arrest attention. Branxholme, close to the Karkloof forest district, shows over 50 inches in the eight months, and that dry corner of the Colony—Weenen—shows the respectable rainfall of over 19 inches for the same period. Heavy storms are characteristic of the year; several stations record over 2 inches fall in a day, and at Mid-Illovo and Equeefa nearly 4 inches fell on the 4th of February. Umzinto lays claim to a rainfall of over 6 inches in one day. Downpours of this class are rarely received with gratitude; if they fall on hillsides under cultivation they wash away tons of the best soil, including the costly fertilisers put into it. At the mouths of the rivers along the Coast a final sight of the spoil may be seen; the waves, including the crests, foam, spume and the rest are the colour of the rich mud of which they are largely composed. Sugar-growers are delighted with the weather, and predict a bumper crop for next year.

BAGS FOR MEALIES.—In view of the large exports of mealies expected to take place this season, the Department of Agriculture has been making enquiries concerning the cost of grain bags. Bags of 2¼lbs. answer the purpose well, and 2½lb. bags are only occasionally used. The present prices of bags are:—2¼lb. bags, 6¾d. each, less 5 per cent.; 2½lb. bags, 7d. each, less 5 per cent. To make provision for the expected mealie export-trade, there is every probability of larger importations of bags than for last year. January and February orders are said to be much in excess of late seasons.

MR. J. MEDLEY WOOD, A.L.S.—Mr. Medley Wood, Director Durban Botanic Gardens, on the 1st of this month completed his twenty-fifth year as chief of that scientific and popular institution. The Gardens when he took them in hand could botanically boast of little more than their name. That defect was soon remedied, and now, for their size, the Gardens compare well with any in the world. And all, be it noted, has been accomplished with a most niggardly revenue. Besides the methodical classification of everything growing, Mr. Medley Wood recently established a "dry garden" or herbarium, which already contains many thousands of specimens of plants South African and foreign. His Work, "Natal Plants," is one of great research, and of which he may well be proud. Mr. Medley Wood, as very many can testify, is always ready to give all information about every plant that may be sent to him for identification. His cheery nature—he is now in his 80th year—and his readiness to put his great botanic knowledge at the disposal of all genuine enquirers are known far and wide. May his distinguished and useful career continue for many years to come!

RAMIE.—Mr. J. Medley Wood, A.L.S., in the *Witness* of the 11th inst., sounds a note of warning to those who may be inclined to plunge with over-zeal into a Ramie-growing business. In the *Journal*, from the very first, while republishing unstintedly the glowing panegyrics periodically being given to the public on this undeniably splendid fibre, we have also from time to time pointed out some of the more obvious inconsistences as regards the alleged profits to the growers. Mr. Medley Wood says that if the machine referred to by Mr. W. J. Bell in his article on Ramie in the last issue of the *Journal* will do what is claimed for it the future of Ramie is assured. As will be seen, all hangs on the word "if." The description of what this machine can do is taken by Mr. Bell from the *South American Journal.* What that publication says the machine can perform sounds marvellous; in one day it will produce a ton of what is selling in London from £30 to £40 per ton—and of better quality, from a material that one of the chief apostles of the industry (Mr. Radcliffe) asserts can be grown with Asiatic labour for £7 or £8 per ton. All, we repeat, depends on the word "if." The Indian Government have offered on more than one occasion prizes of £5,000 for the invention of such a machine. It is said that inventors—British, French, German, and American—have expended hundreds of thousands in money for the production of such a machine. If the qualities are as stated, confirmation from India, China, Egypt, etc., may be soon be expected. In the meantime the hope may be expressed that writers on Ramie will be more specific in their terminology; reference to ribbons, filasse, fibre, China-grass, etc., as one and the same, also decortication and degumming, accounts for infinite confusion when considering the question of profits.

A Railway Matter.—A correspondent asks for information on a subject which was dealt with in a "Short Note" three years ago. The Note was as follows:—One of the most irritating annoyances in connection with the adminstration of country railway stations has been the omission to notify consignees by post of the arrival of goods. In Durban and Maritzburg, consignments are delivered, but in the country the consignee only learns of the arrival of what is sent to his station by the personal courtesy of the stationmaster, by chance, or by continuous enquiry. It is strange that such absence of method should have existed so long, and should have been endured with patience. When the post offices receive a parcel the consignee is informed of the arrival by a notification immediately posted to him. People living in the country will be glad to know that in future the railway will act on similar lines. In recently issued Instructions to the Railway Staff, Clause 8 (Goods to be advised) directs that:—"in future an advice must be sent through the post by all Stationmasters to all consignees, advising the arrival of their goods." This should prove a great boon; there should be no necessity in future for people to send messengers with notes asking if expected goods have arrived, or even worse still, sending a wagon after having given a reasonable time for delivery, to discover only that the goods have not reached their railway destination. In the future, it may therefore be understood, that if a country consignee does not receive prompt official notice of the arrival of his goods, there has been a dereliction of duty; if the dereliction is not satisfactorily explained by the official concerned, it should be promptly reported to the headquarters. Such reporting, however, is a disagreeable business for people, and is apt to be shirked. If the inspecting officers—particularly for the first few months—would carefully compare the counterfoils of the advice-book with the arrival of goods at the stations, a fairly effective check against negligence would be established. Consignees, however, must be prepared to help themselves, the boon—and a great boon it is—has been granted by the railway management, and if the system is not soon working with the automatic ease and regularity of the Postal Department in the matter of parcels, the fault will largely be with the people themselves.

Fibre Cultivation.

SISAL AGAVE, *FOURCROYA GIGANTEA*, AND RAMIE.

By Cesar Rositzky, Port Shepstone.

In consequence of the many inquiries received lately relative to the cultivation and preparation of fibre, at the request of the Department of Agriculture I am embodying the results of my studies, experiments, and experiences, in the form of an article for this *Journal.*

Most of my information in the first place I received from books and periodical literature, and by correspondence with various planters and others interested in fibre. Later on I visited plantations in German East Africa where fibre-growing is now an established industry.

AGAVE SISALANA.

The Sisal agave is grown principally in Yucatan, from the port of which—Sisal, where most of the fibre is shipped—it derives its specific name.

I have received information from there, as well as from the Bahamas; but as the methods are all very much the same as those in vogue in German East Africa, I will relate only what I saw and heard there on my visit in May, June and July of last year.

The plantations there are mostly in the hands of large companies, but already the small capitalist is beginning to invest in this business, and the outlook is apparently promising.

The Sisal agave grows best on dry soil containing plenty of lime. The plant is propagated either by shoots or bulbs, but the former are preferred. There is no cultivation of the land. The bush is cut down and grass burned, and the plants are then put in 9 x 9 feet, or about 600 to the acre. The fields are kept weeded during the first two years; after that period the plants are strong enough to keep the weeds down themselves.

When the plants are three years old, reaping begins. The leaves are cut, and the fields cleaned, and new rows are planted between the old rows, in order to keep the plantation going. The planter only reckons upon three crops in all from a plantation. After that the plant "poles" and dies.

Every plant gives about 40 leaves yearly. It is advisable to cut only such leaves as hang at an angle of more than 45°, away from the stem. The leaves are taken to the mill, which should be placed as central as possible in order to save transport and labour, for the leaves are very bulky and heavy, each weighing from 2 to 4 lbs.

The mill, or decorticating-machine, which appealed to me most consists of a number of common raspadores fixed to a shaft. These raspadores consist of large wheels of about 3 feet diameter, and 12 to 18 inches face (on which the beating knives are fastened), and a sort of feeding table. On each side of the table stands a native, who introduces one half of a leaf into the machine, and allows the knives to beat off the flesh; then he pulls the leaf out, turns it over, and repeats the procedure with the other end. At each raspador two men do the milling, two boys keep them in raw material, two boys carry the fibre away, and one man scrapes the refuse from under the machine. Thus seven men can do about 5,000 leaves per day of ten hours. Of course one may have as many raspadores (each served by seven men) to one shaft as one requires. A double raspador is reckoned to require 5 H.P. A recent improvement on the raspador is a pair of crushing-rollers to flatten the thick end of the leaf, and an arrangement to throw out the leaf at a certain point, so that the worker need not push or pull and can work a leaf in each hand, and so double the output.

If there is sufficient work, a planter should invest in a large machine, such as the "Corona," the "Condor," or the "Matador." These machines work automatically and strip from 50,000 to 150,000 leaves per day, requiring only six men. To do the same number of leaves in a day on 10 raspadores it would take some 70 men.

The "Condor" and the "Matador" have elevators and hoppers to feed them, so that the leaves need only be thrown in by the armfull at one end of the machine and the fibre comes out hanging neatly over a rail on the other end. With the "Matador" trucks and rails are supplied, and the machine deposits the pulp into one truck and the fibre into another, so that only very few hands are required. The latest improvement with this machine is a complete plant for sending the fibre in a truck to be washed immediately, and from there to a drying apparatus, and next to the baling press, so that fibre can be cut in the morning and be on the train the same day, in spite of any amount of rain.

No doubt our natives are very lazy and very expensive, so that we should use as much labour-saving machinery as possible. I consider it wise even for a small plantation to use a large machine, if capital permits, because the crop comes in so much quicker, and plenty of time is left to extend the plantation with the same amount of labour.

The great question is, of course, always the same:

DOES FIBRE-PLANTING PAY?

I will give a few figures as I have them from different parts of the world, and from them readers can calculate for themselves what the prospects are. I suggest that we should *cultivate* the land for Fibre; then our cost would be, say, for 100 acres:—

	£
Land price @ 10s. per acre	50
Ploughing and harrowing @ 20s.	100
60,000 plants @ 6s. per 1,000	18
Planting	7
Weeding for two years, say	30
(this should be paid for by catch-crops)	
Total	£205

60,000 plants should yield—

	lbs.
The 1st year, 3lbs. each	180,000
The 2nd year, $1\frac{3}{4}$lbs. each	105,000
The 3rd year, 1lb. each	60,000
Total	345,000
Or some	150 tons dry fibre

which would fetch in England £42 per ton, or .. .. £6,300.

From this must be deducted the cost of reaping, milling, transport, freight Home, agency, etc., @ say £10 per ton, £1,500. This would leave a net profit of £4,800 for 100 acres for three years, or £16 per acre per annum.

Whilst all this is proved for Sisal fibre, it is not so easy a matter to furnish information on

FOURCROYA GIGANTEA OR MAURITIUS FIBRE.

The fact is, nobody can give reliable figures. We can only compare, for we have no plantations yet of any extent and in regular reaping, from the results of which we can judge.

We hear from Mauritius that there the yearly crop per acre is about a ton, and that the aloes are planted 4 x 4 and 5 x 5 feet. We hear also that the same aloes grow considerably larger on the African coast than in Mauritius, and therefore, I think, we may safely reckon upon a ton of fibre per acre in Natal.

In German East Africa *F. gigantea* was planted at first, and enormous plants were obtained (I have seen leaves 15 feet long and 12 inches wide); but when it came to reaping it was found that the leaves contained only $\frac{3}{4}$ per cent. of dry Fibre. All the plants were therefore destroyed and the Sisal agave put in their place; this yielded leaves 4 to 5 feet long, with 3 per cent. of dry Fibre.

I believe that the coast lands in German East Africa, which are almost under the Equator, are too hot and too rich for *Fourcroya*. A certain small lot grown on the higher land inland, and crushed on one of the plantations, proved to contain $3\frac{3}{4}$ per cent.

I have crushed many leaves, and have experienced most bewildering results. I have cleaned aloe leaves from this district which were 7½ feet long, weighed 6½lbs. each and gave 12ozs. of dry Fibre, equalling 12 per cent.; and, again, 3½ year old leaves, which were 6½ feet long, weighed 4½lbs., and gave only 4ozs. of dry fibre, equalling 5½ per cent.

No doubt rich land produces large, rank plants with large leaves, but these large leaves yield no more fibre than smaller ones. They weigh a great deal, and consequently their percentage of fibre is naturally low.

I have planted *Fourcroya*, and I reckon that I shall get from 700 plants to the acre (7 x 9 feet) and about 22 leaves per plant, weighing 4lbs. each and yielding 3¾ per cent. of fibre,

$$\frac{700 \times 22 \times 4 \times 3\frac{3}{4}}{100}$$

equalling 2,310lbs., or, roughly, 1 ton,
which is worth in England on an average, according to the last 12 months' price-lists, which I receive regularly, £32.

Supposing that the cost of reaping, milling, transport, freight, agency, brokerage, etc., will be about £12, then I shall have £20 net profit per ton or per acre, and that very likely for some years, because the *Fourcroya* seems to live longer than the Sisal. I quite expect, however, that the yield of *Fourcroya* will also fall off to a certain extent after the first crop. But that is of no consequence, as, with such results, we shall simply extend the plantation and so increase our income.

Sisal fibre fetches a higher price per ton, but I expect *Fourcroya* to yield a larger crop, and through that to pay better. Although it is not proved, I consider good results certain with *Fourcroya*.

There remains only one important matter to deal with, and that is the question of the

MOST SUITABLE MACHINERY.

As I have said before, Sisal leaves are from 4 to 5 feet long, weigh about 3lbs. each, and contain rather thick, strong fibre. *Fourcroya* leaves may grow 10 feet long, weigh up to 6 or 7 lbs. each, have a very thick lower end, and the fibre is thinner and weaker than the Sisal fibre and more liable to break in the machine. The consequence is, that we can very well crush Sisal leaves on machines made for *Fourcroya*, but by no means must we take for granted that all machines which clean Sisal leaves well will also be suitable for *Fourcroya*.

I have seen many machines and have also worked them; and I have come to the conclusion that, for *Fourcroya* plantations of any extent, the large "Corona" and "Matador" machines, which save labour and work with a minimum of waste, should be chosen, and for small plantations the simple raspador or "Gratte," as it is called in Mauritius. Both words mean "scraper."

I repeat that all *Fourcroya* leaves of any size have a very thick lower end, some 3 to 4 inches in diameter, and that these ends must be crushed flat before the leaf goes into the machine; otherwise the fibre contained in that end is simply beaten off and lost. That crushing means, of course, a special machine for large concerns and at any rate extra handling and consequently extra expense.

Only the "Matador" has a crusher combined with the mill. The leaves thrown by armfuls (not leaf by leaf) into the elevators, are turned into the hopper, come out from there singly, pass the crusher and go into the elevator, all automatically. Below the decorticator stands a truck, to receive all the pulp and refuse. The fibre runs into another truck, in which it goes to the wash, from there to the drying apparatus and then to the baling press, with very little handling.

I shall now give a few hints regarding machinery plants for different sized plantations:—

20 acres, equalling about 300,000 leaves, to be reaped in 90 days—

	£
Single Raspador, say	60
Horse-gear, say	25
Crusher (a wooden hammer will do).	
Polisher	40
Press	20
	£145

50 acres, equalling about 750,000 leaves, to be reaped in 100 days—

	£
Double Raspador	140
16 H.P. Gas Suction Engine (allows for a second Double Raspador to be added when required)	420
Crusher	60
Polisher	40
Press	45
	£705

200 acres, equalling 3,000,000 leaves or more—

	£
Decorticator, "Matador"	600
25 H.P. Gas Suction Engine	546
Double Polisher	72
Hydraulic Press	150
Five trucks, rails, pump, tank, drying-apparatus, etc.	300
Shed, etc.	332
Say in all	£2,000

All these are, of course, approximate prices, although they will not be very far out.

RAMIE.

I do not think it is necessary for me to describe this plant; so many have done that before me. It has been long known to contain a very valuable fibre, but the cultivation was not developed, because there was no machine to decorticate the plant—the Chinese do it by hand.

Ramie fibre is used for all fine materials. Tablecloths, linen, clothing, blankets, carpets, laces, silk, neckties, etc., are made partly of ramie fibre, if it is obtainable. There is an ever increasing demand for the fibre.

Ramie requires a damp, warm climate; if it is too cold, it will grow slowly. Good, rich soil should be chosen and tilled 18 inches to 2 feet deep. Continual drought does not do a plantation much harm, but too much wet causes the root to rot in a few days. The plant is propagated by seed or by cutting from the root. The latter method is preferable, as the plant takes so long to grow from seed. The plants are put in 3 x 3 feet, and the field must be kept clean for about three months; after that the ramie will keep the weeds down.

The first crop should be ready six months after planting out. The stems are ready to be reaped when they are 4 to 6 feet high, when blossoms appear and the stems turn brown from the ground upwards. They are cut off close to the ground and run through the decorticator. A small "Aquiles" machine put on a little hand-cart can easily go through the fields as the reaping proceeds.

The refuse remains in the field as manure, and the fibre (undegummed) is dried in the sun and pressed into bales, ready for shipment.

There should then be a crop every three months from good fields.

It is reckoned that each plant grows 45 stems four times a year, so that an acre with 4,000 plants should yield, if each stem weighs $1\frac{1}{2}$oz. and gives 5 per cent. of clean, dry fibre,

$$\frac{4{,}000 \times 45 \times 4 \times 1\frac{1}{2} \times 5\text{ozs.}}{100}$$

equalling 54,000ozs., or $1\frac{1}{2}$ ton.

of a value of £33 10s. per ton in England, as was quoted to me about two months ago.

The machine is light, can be worked by a child, and decorticates 10,000 stems per hour. The cost is £90.

I feel certain that the fibre industry has a great future in Natal, and I hope that many farmers will give it a trial. I repeat, that none of my data regarding *Fourcroya* and Ramie must be taken as reliable facts, but they are the outcome of over two years of systematical, careful study, and I believe them to be as correct as such calculations can be. I myself have begun operations on the strength of them.

[In the next issue will appear illustrations of some of the machines described in this article.—Ed.]

Ramie.

F. de V. writes in the *Jamaica Agricultural Journal*:—Of all textile plants the one which furnishes the best fibre, containing at the same time the least gum, is a plant of the *Urticaceae* family, named after the German botanist Boehmer, *Boehmeria Nivea.*

In its raw state, that is to say, not yet degummed, the fibre goes by the name of China-grass, very improperly so, for the plant does not grow exclusively in China, and moreover is not a grass. The degummed fibre is called Ramie, an article for which there is a constant and increasing demand.

The Ramie fibre is one of the finest, most brilliant, and at the same time one of the strongest of vegetable fibres. Its commercial uses are so varied that it is hard to tell where it cannot be employed. It makes the finest gossamer cloth, and the strongest and most durable canvas for sails; combined with linen and cotton it increases their strength and lasting qualities, and as for rope and other coarser products, its merits are too well known to be further mentioned.

Cultivation.—The ramie plant requires as even a climate as possible, and a moist heat; regular rainfall and proper planting at the proper time are vital requirements which must be fulfilled by the planter wishing to obtain fibre of the finest quality; its cultivation resembles that of cotton closely; a steady rainfall when the plants are young, and dry weather when they have matured being essential.

The best soil is a fine sandy loam, which must be well drained, as stagnant moisture is the Ramie plant's worst enemy; it causes the roots to rot, which they do very easily, thus, of course, killing the plant, literally drowning it.

The seasonable parishes in this Island are well suited to its cultivation, especially the valley sides, offering ideal sites. Its root-system bears a striking resemblance to the strawberry plant—it sends out runners or racemes, which, when strong enough, can be detached from the mother plant and planted out separately.

It is, however, not so much my intention to dwell on the methods of planting and cultivation as on the harvest of the Ramie stems and their subsequent conversion into the China-grass of commerce.

The plant is fit for cutting as soon as the flower appears. The stems are five to six feet high, and the thickness of your finger. The cut and ripped stems are passed through the machine mentioned briefly in the last issue of the *Journal* (it is called the Aquiles, and is manufactured by R. Boeken & Co., Limited, Dueren, Germany).

The advantages of this machine are, firstly, its low price (£60); secondly, its extreme portability (two men can easily carry it about); thirdly, the low power necessary for its working; and last, but not least, its freedom from delicate parts, easily broken and hard to replace.

As indicated before, the machine is built on an entirely new principle, the most valuable result of which is that the long fibres are delivered long, unbroken and in parallel layers, the three points which, together with the colour, determine the market value of "China-grass."

After treatment in the machine, the fibres are dried in the bales and shipped.

Before being sent to the looms, they have to be chemically treated and "degummed." Information as to the method best adapted to degumming is at present not to be had.

Yield.—You may rely on a crop at least every six months. Each plant yields on an average 45 stems each cutting, that is to say, 180 stems per year per plant, or 72,000 plants per acre, if planted 4,000 to the acre.

The average weight of the stems stripped clean being 50 grammes, the annual yield per acre will be 36,000 kilogramms, or 64,800lbs.

Taking into calculation an average yield of five per cent. of raw fibre, the acre will yield 1¼ tons of dry China-grass, at a market price varying between £18 to £22, according to the care bestowed in keeping out impurities and producing a uniform long-fibred, even-coloured product. The acre will thus show a yield of £22 10s. to £27 10s. Allowing 25 per cent. for expenses, the net income per acre will amount to from £18 to £22, a figure which should prove attractive enough perhaps to induce some planters to at least given Ramie cultivation a thorough and fair trial.

Lightning.

THE following is extracted from a long and interesting article contributed by Mr. J. P. Pask, A.M.I.E.E., to the *N.G.R. Magazine*:—

In Natal the problem of affording protection to a building is not a particularly difficult one; it is made easy by the generous use of galvanised iron in the construction of our dwellings. I much question whether lightning, with all its evasiveness, could find a means of entrance into a galvanised iron house if the following simple precautions were taken in building it:—The roof and sides must all be joined together in metallic connection; strips of galvanised iron should pass from the roof to the sides, and also join up with the rain-water guttering. One or more conductors, according to the size of the house, should be run down the building, terminating in a short rod about 2ft. 6in. above the highest point of the house, and one should certainly be fixed to the kitchen chimney, if it is made of brick, and if it is an iron chimney it should be connected to the ironwork of the building, or to the conductor itself. The conductors should be riveted and soldered to stout copper plates, which should be buried in damp earth. Up-country, thunderstorms usually come when the ground is like hard-baked clay, and often some fearful flashes descend before the rain falls. These are very dangerous, and as the earth plate is often buried in the hard clay, the lightning rod itself may form a source of danger by receiving a discharge which it cannot dissipate. The plate or plates must, therefore, be buried in or quite near the dam, if there is one, so that they are always in moist earth. If there is no dam, a gutter should be made, and all water from the kitchen, and that used for domestic purposes in the house, should be led by it to the ground over the earth plate, and so keep it moistened.

The conductors should not be held away from the building, whether of brick or iron, by insulators, but should be supported from it by metallic fasteners or staples, which, while in metallic connection with the building, would keep the rod off some 1½in. to 2½in.

For the sake of the timorous, I may mention that during the progress of the storm, it is advisable to keep the windows and the doors closed, so as to avoid draughts; lightning is partial to these. It is also as well to keep away from the chimney for the same reason; and also from using knives and forks, and other metallic objects, if a severe storm is immediately overhead. If you are outside, on no account get under a tree; it is also well to avoid contact with telegraph and electric light poles, as they sometimes give out sparks during a storm. It is also advisable not to run, as the current of air thus set up affords an attractive path for the flash. I have often been asked whether travelling in an electric tram is safe during a storm. Tramcars are frequently struck by lightning, but they are so well protected from the effects of the lightning that it is extremely rare for passengers to be injured or made uncomfortable from the occurrence.

It may be of interest to farmers up-country to know that, in a report prepared by the Weather Bureau of the United States Department of Agriculture, we find stated:—"Unquestionably, wire fences, as now constructed, serve as death traps, causing a vast amount of loss every year; there were evidences that the lightning struck the fences at a considerable distance from the point where the stock was killed."

On account of the parched nature of the veld at the commencement of our summer season, it is difficult to make any form of wire fencing quite safe as regards lightning, and the danger is enhanced by the peculiar susceptibility of horses and cattle to electricity. But we may, however, take such measures in constructing the fence as will ensure our stock a comfortable degree of security. Wooden end and supporting poles should on no account be used. Iron poles must be used throughout. The intermediate posts should go some distance into the ground, and it will improve matters if each post has a base plate. Where the wire passes through the post, it should be in close metallic contact thereto. Stay wires must be fastened to iron plates, not to wooden ones. If there is a stream of water or permanently damp earth near the fence, all the horizontal wire should be joined up to a cable made of about five galvanised iron fencing wires stranded together, and the end of the cable securely fastened to a large iron plate, well buried in the moist earth. I am afraid there is at present no way of protecting oxen and mules trekking across the open veld; the best thing is to stand still during the heaviest part of the storm, and trust in Providence.

Iron linen lines are a source of danger in the same way as the fencing wires, and every year brings reports of women who, in rushing out to save the linen from being spoilt by the rain, have received bad shocks, and in some instances been killed.

UMZIMKULU ESTATES CO.

Suspension bridge for steam tram-line : South side.

Fibre.

INTERVIEWS WITH MR. N. C. T. HARPER AND MR. C. ROSITZKY

By Ergates.

Six years ago I gave a description (page 143, Vol. IV.) of the Umzimkulu Sugar Estate. The Hon. J. G. Maydon, M.L.A., was the "interviewed" on that occasion. The information as to other neighbouring industries, etc., I find, on reference, to be almost as serviceable as when gathered.

THE UMZIMKULU SUGAR ESTATE.

Mr. Harper is the General Manager of the Umzimkulu Sugar Estate, which, after the manner of Natal sugar estates, has been growing. The Umzimkulu now comprises the Barrow Green, the Esperanza, and the Ruthville estates. The area under cane is being quickly increased; at present 3,000 acres are planted. The mill-power is also growing; an additional pair of rollers 28 in. by 56 in., weighing about 5 tons each, are being put down. On arriving at the mill, where I met Mr. Harper—I came up the river in his motor launch—I found him engaged in the erection of a suspension bridge across the Umzimkulu. The accompanying photographs will show that this is not a small undertaking. In length the bridge will be 480 feet, and is designed to carry a locomotive and a train of cane-loaded trucks. The erecting is being wholly done by the estate hands under the General Manager's superintendence. Mr. Harper, I may here mention, is an engineer by profession.

TELEPHONES.

Before closing my remarks about the sugar estate I must make a short reference to the telephone system installed. There are 4½ miles in the system, and there are five instruments. What was the cash cost? Thirty-two pounds for the plant, including surplus wire and insulators. The instruments cost £2 10s. each, and similar instruments, so Mr. Harper told me, can now be obtained from the Durban Corporation for only 5s., the Corporation having recently discarded the "ringing-up" instruments. Here is a chance for farmers desiring telephonic communication at practically no outlay in money.

FIBRE.

I now come to the subject of fibre; to learn something about it was the main object of my visit to Port Shepstone. I may as well admit that on fibre-growing in this Colony I did not quite possess what is called an "open mind." I was of opinion that fibre would only thrive on a commercial scale in a very tropical climate with very rich soil and a supply of very cheap labour. In these respects I regarded Natal as deficient. With my mind so prejudiced I plied Mr. Harper with questions.

It is necessary in the first place to say something about Mr. Harper. As already stated, he is an engineer by profession. At the Elandslaagte

Coal Mine he installed coal-cutters—the first in South Africa—also at the St. George's Mine. To the Cambrian Mine he supplied ventilation fans extracting 300,000 cubic feet of air per minute, and at Nel's Rust farm he put down an electrical plant, including turbine, generator, four motors, refrigerator, pumps, etc. This would appear to speak well for his mechanical aptitude; and for his general aptitude as a planter eight years with Messrs. Reynolds Bros. as manager of the Esperanza section of their estates, and his present position on the Umzimkulu Estate, should be sufficient testimony. The statements and opinions of such a man naturally had weight with me. For several years he has given some thought on and off to fibre cultivation, and recently he investigated the subject in every particular. Last month he floated a small fibre company in which his interests are almost entirely prospective and contingent.

CLIMATE, ETC.

"Is Natal, I said to Mr. Harper, sufficiently tropical? Can Natal hold her own against countries with deep, rich soil, constant high temperature and constant humidity?"

"Those features," he replied, "I do not think essential. My personal knowledge of fibre, save for many experiments during the last two years, as I have already made clear to you, is limited; my other knowledge is second-hand, but such as it is, it is the outcome of studying all—yes, I think I may say practically all—the literature on the subject. Now, in the first place, we who live in this corner of the Colony know that the fibre plant called the *Fourcroya gigantea* aloe of Mauritius thives well when we plant it under reasonable conditions as to situation. In size our aloes are larger than those grown in Mauritius, and experiments which I and others have made have shown even an advantage in the Natal-grown as regards the proportionate output of fibre. Commercially, of course, one wants fibre—not flesh; indeed, when it comes to the manipulating, the greater the proportion of the watery flesh the greater the attendant expenses. In 1902 Yucatan produced £2,750,000 worth of fibre. In the previous year, when the price of fibre was low, Sir D. Morris, then Assistant Director of the Kew Gardens, estimated the profit per acre at £5.

LABOUR.

"And now," I said, "as to labour? The cost of Natal labour must surely compare unfavourably with that of fibre-producing countries. I think we may take a man's work to cost here in Natal quite 8s. per week."

"Yes, about that, but it should be remembered that there is plenty of light work in cultivating aloes that coolie women can do, and that would bring down the price somewhat. In Mauritius fibre growing pays, and pays well, and there you have the wages question practically the same as in Natal. My friend Mr. A. C. Mitchell-Innes recently visited Mauritius with the object of closely investigating the business there in fibre production. The most of the fibre in the island comes from uncultivated

UMZIMKULU ESTATES CO.

Suspension bridge works on North side.

naturally growing aloes, and the manufacture of the fibre from them is conducted most primitively and wastefully. There are, however, two or three estates where fibre growing is being methodically managed, and the accounts, kindly shown to him, proved that over a series of years, despite heavy freight and shipping charges, each ton of fibre gave not less than £10 clear profit. Here, then, is an example where the rate of labour is practically on a par with that of Natal. It should also be taken into consideration that Mauritius—also Yucatan and several other fibre countries—is subject to winds of hurricane force, winds that do serious harm to the fibre in its growing stage, and in consequence must affect the Mauritian profits over what Mr. Mitchell-Innes calls a series of years. Now let us refer to the price of labour in the Bahamas—a fibre country to which you have referred. This British Colonial-Office publication gives 9s. a week for mill hands and 5s. for field hands, a price for labour not varying much from that of this country. These figures of the Bahamas may be of interest; in 1899 25,000 acres were under cultivation, and the output of 1,358,682 ℔s. of fibre—Sisal—showed an increase of 106,952 ℔s. on the biggest of previous years. On the cost of labour I am of opinion that there is no sufficient cause for misgivings. In connection with this question there is the great advantage that with proper management the work can be carried on evenly all the year round; there need be no rushes, as with sugar, cotton, etc."

The foregoing gives the gist of a lengthy conversation, much prolonged for the verification of all statements by constant reference to official pamphlets, Consular reports, etc. At the conclusion Mr. Harper said he would introduce me to Mr. Rositzky, of Port Shepstone, who was also a thorough believer in the profits of fibre growing.

Mr. ROSITZKY'S VIEWS.

Mr. Rositzky is a German who has a store in the village of Port Shepstone and a farm a short distance away. This year Mr. Rositzky has put in a hundred acres of *Fourcroya gigantea*, the Mauritian aloe, by way of a commencement. Mr. Rositzky has unshakable faith in fibre growing for the Port Shepstone district. He is an enthusiast with public spirit, and is incessant in his counsel to the small farmers of the district to go in for fibre. Many of them, he says, are making only the barest existence, and their farming, he believes, cannot lead to anything better. He would much like to see everyone of them putting under fibre just 10 or 20 acres every year. For the planting and cleaning, he believes that not much labour beyond that provided by the families would be required, and from the fourth year he holds they would be in possession of comparatively substantial incomes. Of course, if three or four neighbouring farmers would combine, firstly by growing the fibre as centrally as possible, and then by buying the necessary machinery together, there would be advantages to be mutually reaped. The necessary machinery would not be disproportionately costly; say, horse or ox gear £25, a gratte or raspador £60, polisher £40, and press £20. This comes to £145, and the first crop of 20 acres could, he believes, be safely relied on to give at the least £200 of profit. Thereafter the small grower would be fairly started in the industry. Even about the machinery he thinks the grower need have no cause for anxiety; he feels sure that if the small farmers took to growing the fibre generally there would be individuals ready to provide and work the machinery on hire or on shares.

Mr. Rositzky, as I have said, is an enthusiast about fibre growing, but for all his statements and opinions, on provocation and without provocation, he brought up whole armies of recorded facts which, so far as I was able to judge, carried conviction. What he said in the course of our conversation may be summarised as follows:—

FOR SMALL FARMERS.

"The *Fourcroya gigantea* grows well in this district, where we have scores of small landholders doing no good for themselves. How many of them live is a mystery. If they would only grow fibre on a co-operative system money would come to them. I gave much time and spent some money to equip myself with knowledge of the details of the whole subject so as to formulate a scheme. I have not yet been able to influence them, nor indeed to awaken any interest among them; they are terribly apathetic. I am starting fibre growing on a small scale, and when they see that the fibre brings in money to me I hope they will follow. In their position they are able to put every year a few acres into aloe cultivation at hardly any cash outlay.

FIBRE IN GERMAN EAST AFRICA.

"When I got hold of the fibre-growing idea, the idea soon got a firm hold of me. So firm was the hold that I determined to visit the fibre growers in German East Africa. I was most kindly received. The Governor gave me all the information at his disposal, and from the planters during my stay of a couple of months I received the greatest hospitality, and everything as regards cultivation and manufacture they not only showed me but allowed me to take a hand in. With such facilities and being keen to learn, I consider that I have now a fairly good grip of the business. The German planters on the rich Coast lands began with the Mauritian aloe (*Fourcroya gigantea*), but soon found that the raw leaves gave only ¾ per cent. of fibre. As a plant this aloe on the coast-lands of East Africa flourishes to perfection. I saw plants fully 15 feet high and the leaves a foot in breadth. Recently, however, it has been found that the *Fourcroya* planted inland runs less to flesh, and on a small scale has given as much as 3¾ per cent. to the leaves. The planters all work independently of each other; there are no central mills. The *Fourcroya* has been wholly abandoned for the Sisal agave. Sisal fibre fetches more than the *Fourcroya*—at present the balance in favour of Sisal is £6 to £7 per ton. Sisal in East Africa gives three crops; in its first year (fourth year since planting) 3 ℔s. of fibre per plant, second year 1¾℔s.; third year 1℔., or, per acre, respectively:—1 ton; 1,250℔s. and 700℔s. When the first crop is cut new plants are planted between the rows. In German East Africa there are about 10,000 acres under cultivation, and every fortnight in the year may be seen the shipping of several hundred bales of the fibre from the Port of Tanga for Europe. The present price per ton is £42 10s., which, over six years, gives a gross return of £85. The freight and shipping charges to Europe amount to about £12 10s. per ton. About labour? The price per month is about 10s.; nearly all the work is done on the task system."

SOME IMPRESSIONS.

The foregoing evidence—much summarised—as to the practicability of growing aloe fibre profitably in this Colony is most encouraging if not conclusive. Both Mr. Harper and Mr. Rositzky are shrewd, cautious men, knowing the agricultural conditions of their district perfectly, and in all respects are eminently practical. Speaking personally as "Ergates," I have the greatest hopes in the success of the industry. The aloes appear to be immune from locusts and other plagues, spells of drought do not injure them, and, if properly cultivated, they run no risks from winter fires. That the aloes of commerce are not indigenous to the Colony appears to me to be a fact of small moment. The Acacia mollissima is not indigenous; instead of growing naturally in vast forests, it has to be raised from seed and cultivated, and yet our wattle-plantation owners can tell that the profits accruing are substantial. So may it also be in fibre growing. As to profits, they will vary according to the fluctuations of the market. An American fibre Trust some years ago ran the price up to £75 per ton, and on the Trust bursting the price collapsed to £15 per ton for a short time. There seems to be every reason to believe that fibre in the Colony can be produced under that price per ton, and therefore the chance of actual loss requires barely any consideration. In these remarks I am assuming that the management will be competent. If the growing should be undertaken by an individual as a bye or side industry there may be some latitude for slack management, but in the case of companies and syndicates, necessarily encumbered with special expenses, the management should be as perfect as it is possible to obtain. Such enterprises should follow the system of the best of wattle companies as regards the financing and the office work, and every shareowner should realise that practically everything will hang on the management. The man on the spot must be capable, energetic, and, above all, a first-class hand at organising coolie labour to the best advantage. No detail should he consider too small for his personal attention; proper attention to details will be the chief factor as regards success or non-success. Considerable mechanical knowledge on the part of the manager will also be indispensable. Happily such men are to be found on the Coast; the sugar companies produce them.

Extreme Types: Their Multiplications.

C. J. Davies, in the *Live Stock Journal*, writes:—New knowledge tells us that every character in an animal is represented by definite units in the germ cells, which units are responsible for its transmission from one generation to another. This conception of the germ cells as composed of a host of units, present in definite numbers, some active and some inactive, suggests, moreover, that the individual must be valued rather for the units it bears than for its obvious external characteristics. In future we may be certain that the test of breeding alone will reveal the hereditary value of animals of unknown parentage, although in the case of those whose parentage is known a fairly accurate forecast can be made of what to expect under given circumstances. Mendel's principles only deal, however, with the broad issues in connection with breeding. They give us a clue to the workings of heredity under conditions of cross-breeding between any two definite unit-characters, and this is, of course, extremely valuable to a large class of breeders.

Men who are breeding stock for the showyard, however, are not as a rule practising any form of cross-breeding. That has been done generations back; the animals have been selected until their germ cells contain a certain combination of units which give the required type (so-called purity), and forthwith the breeder endeavours to exaggerate the already-existing characters in certain directions by in-breeding. Some points he tries to increase, others to suppress, but in either case he alters already-existing material in one direction or the other, which is an entirely different process to the recombining of old materials which constitutes the making of a new breed or variety.

We know that the units in the germ cells are unchangeable entities—that is to say, that the unit representing, say, black colour in an animal is quite distinct from the unit representing red colour, and that one cannot be changed into the other. To this extent the units are absolutely stable, but some most noted experimenters have been forcibly drawn to the conclusion that the units themselves are liable to a considerable degree of fluctuation within themselves, and that it is this instability or degree of activity of the units themselves with which the fancier chiefly works. It has certainly been lately suggested by someone that every fluctuation may be represented by definite units, but that such is hardly likely to be the case experiments with animals and plants go to prove. For instance, the writer in some investigations into colour heredity in guinea-pigs crossed an individual of a very pale shade of cream with another of a dark colour. The offspring all came patched with the two colours (neither was dominant), the cream being of a light shade in every case. On subsequent in-breeding segregation occurred, and among the numerous offspring bred in succeeding generations from the one original pale cream were animals of all shades, from the palest cream—almost white—to the richest fawn. Surely this must be a case of fluctuating variability in the intensity of the colour itself rather than a phenomenon due to any other cause.

These guinea-pigs have also illustrated in another way the degree of activity of the colour units themselves. As already stated, the mating together of two distinct self-coloured animals resulted in the production of bi-coloured individuals patched with both colours. The amount of the two colours present in the progeny of the first and subsequent generations is subject to marked variation. Sometimes the colour on one original parent, sometimes the colour of the other, predominates, but on an average, among a number of individuals the inheritance of each colour appears to be about equal. Only one guinea-pig in about thirty bred so far has come with about an equal amount of both original colours evenly distributed; as a rule, the animals have a preponderance of the dark or a preponderance of the light colour. Further experiments now in progress alone will prove whether it is possible to regulate the inheritance by mating an individual which has too much of the light colour with one which has too much of the dark, so as to get with a fair amount of certainty a race which is characterised by an equal distribution of both colours.

We have mentioned this matter to show that fluctuations produce nothing new, but are limited to increase or decrease of what is already available. The matter is therefore of the greatest importance to all breeders of show stock, whose object is not to create anything new, but to exaggerate or increase or decrease certain characters which already exist. The fact that there are two kinds of variability is often overlooked by students of Mendel's Principles, and it is therefore essential that the difference should be understood. Changes of wider amplitude are connected with the acquisition or loss of unit characters. Lesser variations (with which the breeder of "pure" stock has to do) are believed to be due to the degree of activity of the units themselves. Once the foregoing principles are grasped, the breeder is in a position to study the laws which govern the multiplication of extremes. It necessitates a dip into Quetelet's famous law of fluctuating variability, to the significance of which little importance was attached until quite recent years, and which has now been the means of clearing up many difficulties in connection with heredity.

Quetelet's law asserts that "the deviations from the average obey the law of probability. They behave as if they were dependent on chance only." To try and explain this simply, we will suppose that 15 h. 2 in. is the average height of a certain breed of horses. If a number of specimens are taken haphazard and measured, it will be found that there will be a dense crowding of instances around the average of the variety, and that on both sides of the mass of the observations there may be a few wide deviations. Thus, presuming 15 h. 2 in. to be the average, almost all the horses will vary between, say, 15 h. 1 in. and 15 h. 3 in., but there may be one or two which will only measure 14 h. 3 in., and one, perhaps, which so far exceeds the average as to measure 16 hands high. Now extremes, whether they be of height, weight, length, size, or some purely minor and minute characteristic, are what the breeder for the show-ring is desirous of multiplying, hence the value of finding out in the first instance the average dimensions of the point in question in the particular breed. Once he gets at the average, subsequent measurements of his stock will at once tell him whether they approach the average or are deviating in either direction. Whether the desire is to reduce or suppress a character, or whether it be to exaggerate it, accurate measurement, weighing, etc., are the only means by which an exact knowledge can be gained of progress towards the desired end, and by which the identity of the widely-deviating individuals can be ascertained.

Once the extreme is identified, the next problem is to bring about its multiplication. Certain facts have been proved in this connection. In the first place, assuming for the sake of simplicity that the average fluctuation of a certain quality in a race is around fifty, rigid selection through a number of generations of extreme types can be made to result in individuals with as wide a deviation from the average as ninety-nine on the increasing side. Further than this it is impossible to go, and a race is only kept up to this extreme limit by continual artificial selection of widely-deviating individuals. Even selection will not bring about the desired result at once, however, because it has been found that the average of the progeny of extreme types lies between that of the original strain and the quality of the chosen parent. Thus, if we are endeavouring to increase the height of horses of a bred which averages 15 h. 2 in., and we find ourselves in possession of an individual which has deviated in the desired direction, and is 16 hands, on breeding from this animal the average height of his progeny will lie about midway between its own height and the average height of the breed—that is to say, a new average of 15 h. 3 in. will be established. In addition to this, fluctuation around this new average will follow the same laws as in the previous case, hence, although the majority of individuals will crowd round the new average of the strain—15 h. 3 in.—yet the wide deviations may give rise to an individual of 16 h. 1 in. If the latter is bred from and is mated with the strain, the average will again be raised to midway between 15 h. 3 in. and 16 h. 1 in., with the possibility of corresponding wide deviations. Thus, step by step, the height can be increased and extreme types multiplied, and the same rules, of course, apply to deviations in the opposite direction. Naturally, very wide deviations are extremely rare under ordinary conditions of breeding, and we have used a rather crude illustration in an endeavour to explain the principle. As a matter of fact, the utmost skill of the breeder will be required in many cases to detect the slight deviations in desirable directions in definite characters, but he may know that once he has identified such he can by breeding from them raise the average of his strain in these particulars, and may in addition have the good fortune to breed an individual which deviates as widely from the new average as did its parents from the old.

The fact that the average of the progeny when breeding from extreme types is higher than that of the race at large, but lower than that of the chosen parent, has no doubt often been a source of disappointment to the breeder. As a matter of fact, however, an animal with a markedly exaggerated characteristic of a desirable nature does more good to a breed by raising the average of this point than he would if he only became the sire of one or two phenomenal individuals in his life, and in future it will be unwise to too hastily condemn an animal as a stud failure because he or she has failed to become the parent of progeny showing an equally wide divergence. The strain is improved by breeding from such, and this is a work of greater value to a breed than many more apparent benefits.

We learn, then, that rigid selection of fluctuating individuals is one of the chief factors to the multiplication of extreme types, and it is furthermore known that the smallest lapse in this direction will in one generation bring the most deviating strain back to the average of the variety. Although a type has to be built step by step from generation to generation, yet it may come down with a run, so to speak, as it is essentially unstable. Once the breeder grasps that unit-characters are stable, but their fluctuations are essentially unstable, he will be on a fair way to having mastered one of the most important points in connection with breeding show stock. This matter is also a key to the necessity for in-breeding prize stock, and, furthermore, gives us a clue to one of the reasons why the crossing of different strains of the same variety is seldom successful.

Naturally we get a further piece of evidence, if such is needed, of the futility of breeding from inferior individuals and trusting to their pedigree, and reversion, and what-not, to give us better stock than themselves. Another factor in the perpetuation of anomalies is nourishment. It has been found in plants, and there is strong reason to believe that the same rules apply to animals, that badly-nourished races tend towards reversion. This is not only so with regard to single individuals, but affects future generations. Thus, well-nourished parents and well-fed offspring should result in a higher quality of stock than badly-nourished ones, as favourable circumstances strengthen variable peculiarities.

In conclusion, it should be borne in mind that a distint line has to be drawn between the production of progeny and production of high-class progeny. The former we know, according to Mendel's discoveries, will always be broadly the same. In the breeding of winners we are dealing with something much more subtle and intangible, and it is only by a study of the principles which are believed to influence fluctuating variability that a proportion of deviating offspring can be looked for with a fair amount of certainty.

Paspalum Dilatatum: Its Merits.

THE following letters recently appeared in the *Journal of Agriculture, W.A.*:—

"I have just read," writes Mr. B. Harrison, Tweed River, "in the *Western Australian* of December 23rd of the projected relinquishment of the timber industry by your company in the Denmark region, where 'Agricola' says 'there are thousands of acres of land of first-class quality, consisting of a red loamy formation resting on a clay subsoil,' and 'your company's line of railway, 29 miles in length, also affords access to additional immense areas of Crown lands of a similarly satisfactory character.' I have read the article which I have just quoted, with great interest, more especially as I know from many years' experience what immense profits and progress your company could make if it embarked in the dairying industry and stock raising, profits from which very few of your landowners in Western Australia have but a faint idea.

"This will be readily apparent to you after the perusal of my circular, a copy of which I enclose, and I also forward you a small sample of seed.

I feel confident that the marvellous Paspalum grass would do well in the Denmark district, and in conjunction with the dairying industry would return greater profits than would ever be possible with the timber industry.

"The Paspalum grass has proved a mine of wealth to the North Coast; it grows in all classes of soil, even on barren sand, and preserves its verdure through summer and winter. Any land on which this grass is established is worth £10 to £20 per acre, and in this district has reached the reserve price of £32 per acre, and the annual rent for Paspalum pasture varies from £1 to £1 10s. per acre.

"A creamery could be erected for £10,000 or £15,000, and if one was erected I feel certain that your land would soon be settled with a large population of thriving farmers.

"It is unnecessary to say more on this subject just now, as my circular and letter will amply prove the truth of my suggestion, which I trust you will carefully consider, and in the meantime I beg to subscribe myself.

"P.S.—I would feel pleased if you would kindly send reply, and I will give any further information on this subject at any time. Paspalum grass is already growing well in several places in Western Australia, and Mr. W. C. Grasby, of the *Western Mail,* says it gives greater promise of success than any grass yet introduced into that State."

The following letter was written by Mr. Harrison and published in the Press on this subject:—

"Would you kindly permit me to give your readers a little information about this celebrated grass which is already growing in many places in your State, and which will, I feel certain, prove of inestimable value to the farmers of Western Australia when they become acquainted with its excellent qualities. The great want in your State, judging from all I have heard and read, is a good and abundant summer grass, and Paspalum is the fodder plant for this purpose. Mr. C. F. Julius, secretary of the Dairymen's Union, Bucca Creek, N.S.W., says in the *Agricultural* (Government) *Gazette*:—'This remarkable plant is quickly coming to the forefront as a grass peculiarly adapted to our uncertain climate. Being a deep-rooter, its properties as a drought-resister alone proclaim it invaluable, and, while throughout the warmer seasons of the year it surpasses all other grasses in the rapidity and abundance of its growth, the severest of our frosts, although retarding its growth, fails to subdue its evergreen state.' It is most efficacious in subduing and preventing noxious growth—a great point in its favour in Western Australia particularly, where the poison plant is so prevalent and proves so injurious to stock. The *Agricultural Gazette* also says:—'A pasture of Paspalum generally thrives so vigorously as to take complete possession of the ground to the extermination of all the other growth.' This is the favourite grass with the stock-owners and dairy-farmers on the North Coast of New South Wales, to whom it has proved a mine of wealth, as it is unequalled, not only for its abundant yield and its adaptability to grow well in all classes of country, but also for its fattening and butter-yielding qualities. The Byron Bay Butter Factory, which was established by our farmers about ten years ago, now pays away annually about £36,000 per month to its suppliers for cream and pork, and the cows from which the milk for this factory is obtained are almost exclusively grazed on Paspalum, and very few of them are either hand-fed or housed during the winter months. I feel certain if the farmers and stock-raisers of Western Australia were acquainted with the great value of this marvellous grass they would not delay in cultivating it extensively, which, once established, remains permanent and enriches the soil in which it is grown, and in Western Australia should carry a bullock per one acre and a half. In the Tweed district it carries more than one head per acre, but the soil is richer here and the rainfall greater than in your State. I need not state the different varieties of soil in which it grows, except to say it thrives best in a moist situation, although it grows well even on the hard bare ridges and soils where other artificial grasses would prove a complete failure. The *Agricultural Gazette* writers also say, 'Our experience goes to prove that Paspalum will grow well and yield abundantly on poor soils in dry areas.' Mr. Grasby, writing in the *Western Mail* of the 6th January, quoted many instances of its successful growth in Western Australia, and he also says that there are local varieties which cause the market gardener some trouble to eradicate. This fact alone would prove that this celebrated grass would do well in many places, as similar conditions would suit the cultivated variety. In purchasing seed great care should be exercised, as much of that obtained from seedsmen is of a very poor quality, and, judging from the correspondence I have received from people in the other States, very little, if any, of the seed they have purchased has germinated, thereby causing dissatisfaction and much loss. At the Hawkesbury College only about 2 per cent. of the seed would germinate, although the grass grew well. Mr. Jas. King, president of the Tweed River Dairymen's Union, says:—'Seed that is grown in this (the Tweed) district is generally well developed. Indeed, if properly harvested, almost every seed will grow.' This should be borne in mind by those desirous of obtaining good seed, and would prevent both loss and disappointment. Land laid down with Paspalum (after being sown with seed at the rate of 15 or 20 lbs. per acre) should be worth from £10 to £15 per acre. I noticed in the *Western Mail* that at Wigan there are 3,000 acres of timber felled and ready to be burnt off or fired shortly. If this ground was sown with Paspalum and a co-operative butter factory erected it would prove an object lesson to farmers of Western Australia, who do not appear to have an idea of the immense profits to be made from dairy-farming. Mr. G. H. Varley, editor of the *Clarence and Richmond Examiner*, is well known, and this is what he says of Paspalum in the North:—'In a letter on the North Coast Railway proposition, Mr. G. H. Varley, of Grafton, made several references to the virtues of Paspalum dilatatum, which shows what wonderful fodder that grass supplies. Having mentioned the preponderance of forest ridge country, he says, "Critics will probably suggest that this class of country is of little value for grazing dairy cattle. But in this connection they may not understand the wonderful adaptability of Paspalum to this variety of country. It is a wonderful fodder plant. Given a sufficiency of moisture, it will flourish in all classes of soil. I have seen it luxuriating in the swamps, with water over its crown; in the Big Scrub in its glory; but nowhere have I seen it grow with greater luxuriance than on the forest ridges. A few years ago the Richmond was threatened by a weed called the Mullumbimby Couch. Cattle fell away on it, and many died. Since the introduction of Paspalum this weed has had notice to quit. As in quality, so in growth, as compared with other grasses—it is Paspalum first, the rest nowhere. It is only the construction of this railway and the throwing open of these reserves which will attract settlement. Under these conditions an energetic man, backed up by Paspalum dilatatum and cows, is almost sure of success. Take the 'big scrub' of the Richmond as a case in point. Fifteen years ago this magnificant tract of country was practically in its primeval state. It was equally provided then, as now, with steam communication to Sydney. No point of it was more remote than 15 miles from water carriage. Yet no progress was visible. Five years later the railway from Lismore to the Tweed was opened. From that day the jungle began to disappear, and to-day the whole face of the country is altered, Paspalum dilatatum being substituted for scrub, and dairy cows for paddymelons. One butter factory alone, which opened with the advent of the railway, has increased its output from one ton a month to 350 tons a month. A herd of cows will easily average £10 per head per annum. One farmer (resident in the Coramba district) published his receipts for one year, which showed a credit balance of £600. His area was only 160 acres.'

"Mr. H. Munsey, of Dundas, N.S.W., says: 'Paspalum is the grass that has revolutionised the dairying industry on the North Coast. Scores of instances can be quoted showing that the capacity of farms has been doubled and trebled, and it forms a dense mass of succulent forage. Having spent over a month going through farms where this grass has been sown, I can safely recommend its planting on a large scale. I have seen farms where 100 head of dairy cattle have been kept all the year round on less than 100 acres of land, giving splendid returns in milk and butter. This grass, if enclosed for a short period during the autumn, will provide a good supply of feed for the winter. Its value at this stage cannot be expressed in thousands of pounds. In conclusion, I need only say, as Mr. Jas. King (President of Tweed River Dairymen's Union) says, "that to write of the merits of Paspalum would require a newspaper."'

"In conclusion, Mr. Editor, I must apologise for trespassing at such length on your valuable space, and I most sincerely hope that what I have written may prove of great benefit and value to the farmers in your State, who should not hesitate or delay in bringing about an era of prosperity by establishing good and abundant pasture—the first step towards founding dairy factories which have proved such a great boon to the settlers in the other States. I will be only too pleased to give any further information to anyone, providing they forward stamps for reply, and thanking you in anticipation,—I am, etc.,

"B. HARRISON.

"Burringbar, Tweed River, N.S.W."

To establish bull-baiting seems a curious form of charity, but in 1661 a certain George Staverton gave the sum of £6 yearly to buy a bull to be baited at Wokingham; enjoining that the flesh, hide, and offal should be sold, and bestowed upon poor children "in stockings of the Welsh, and shoes." The bull was baited until 1823, but since that date it has been put to death in a more merciful manner, and the meat given to the poor.

The Preservation of Fresh Fruit.

In a recent issue of the *Bulletin de l'Office du Gouvernement General de l'Algerie* appears an article on the preservation of fresh fruit on long journeys. Accounts are given of experiments that have recently been conducted, and from them it appears that peat or turf has been found to be eminently suitable as a means of preserving fresh fruit.

The attention of hygienists has been atracted to this substance by reason of its sterilising properties, constituting, as it does, a medium unfavourable to the development of bacteria. The existence of such qualities will secure for peat a large sphere of usefulness.

It is, however, in the preservation of fresh fruit that this substance will be more particularly used. Experience has shown, it is said, that it is superior to every other substance for the preservation of vegetables and fruit which have to survive long voyages.

Among other experiments, it is mentioned that, at the beginning of last year, eleven packages of about eleven pounds, containing oranges, mandarines, and lemons, were sent by parcels post from Palermo, in Sicily, to Togo, a German Colony in Africa. Fruit were sent in reed baskets, packed in fruit paper and peat. Envelopes of silk paper were used to keep the fruit humid. Each parcel contained eight oranges or twelve mandarines. There being no direct communication by sea between Mediterranean countries and Togo, the consignment had to travel *via* Hamburg. At Togo the parcels were kept awhile before being forwarded to their final destination—a town in the interior of the Colony, at a distance of over 230 miles from the coast.

The packages that arrived in the soundest condition were those which were considered most liable to damage, and which were only protected by a rough covering of interwoven reeds. It was observed that the fruit enclosed in boxes covered with tinplate as a rule showed traces of moisture.

Out of 45 fully ripe oranges packed at Palermo, 41 arrived at their destination in a perfect state of preservation, after a voyage of 55 days. The mandarines, generally speaking, also kept well.

The same method of packing was tried in the transport of young trees. The great difficulty was to keep them humid whilst protecting them against moisture. The attempt had been made several times without success to import plants from nurseries in Egypt. By using peat, however, success was ensured. So satisfactory were the results obtained, that it is proposed to import orange trees into German East Africa from French possessions.

These experiments, it is observed, have shown clearly that peat is an invaluable means of preservation in the packing of fresh fruit. Exporters of fruit will be able, by the use of this substance, to purchase when prices are at their lowest, and keep their fruit until sufficient quantities are obtained to make large consignments; and the employment of the new preservative will permit, in the same way, of fruit being gathered and kept for consignment in large quantities to local markets.

Mr. Melmoth G. Kelly, the Acting Conservator of Forests, after careful investigation, is of opinion that, provided the fruit was properly picked and handled, well sweated, and carefully packed, there appears to be nothing very extraordinary in the test described. The loss was just under ten per cent., which Despeissis states is the average loss for curing and long keeping.

The Progress of Agricultural Organisation in Great Britain.

Some evidence of the strides which the Agricultural Organisation Society (England) is making in its endeavours to instil into the farming population of Britain the principles of co-operation and the necessity for practical combination if England is to fight the foreign producer in her own markets, is contained in the latest Report of the Society to hand, for the eighteen months ended 30th June, 1906.

At the annual public meeting of the Society for 1906, the Most Hon. the Marquess of Zetland, K.T., who presided, remarked, in the course of his address, upon the position of a British farmer acting entirely on his own account, and without co-operation with his neighbours. On one side of him they saw manufacturers, tradesmen, and others, all of them only too anxious to supply him with those articles which are essential for the management of his farm at the highest prices that they could induce him to give for them. On the other side of him again they saw tradesmen and others of different kinds, one and all of them equally anxious to take off his hands the fruits of his industry, at the lowest possible prices they could induce him to accept. Speaking in a somewhat figurative manner, he thought they might compare such a farmer to a unit between two opposing forces, each of those forces desiring to obtain a profit for themselves, but neither of those forces appearing to be too solicitous as to the welfare of the individual on whose industry they desired to thrive.

Continuing, the Chairman said he thought it stood to reason that a group of farmers acting together, cultivating for their mutual advantage, and sending, say, for example, one large order to the manufacturer for such articles as they required for working their farms, would be in a better position to make a good bargain for themselves than if they each of them made their own purchases, especially if those purchases were made from the shopkeepers instead of going direct to the manufacturer.

Speaking at the 1905 Annual Public Meeting, the President of the Society, Mr. R. A. Yerburgh, M.P., well expressed the position of the farmer who does not adopt co-operative principles by remarking that the farmer buys retail and sells wholesale. The Society wanted to reverse that process, he continued; they wanted the farmer to buy wholesale and sell retail: broadly that was what they were aiming at. They did not want to decrease the character of the yield of the produce, but they wanted to make the land more productive and the produce still better in quality, for they maintained that English produce was the best of all. The system of co-operation was a very difficult one to bring home to men's minds. In interfering with the past one had to go very slowly and carefully. Of all forms of co-operation the easiest to deal with was that for the purchase of requisites, and, therefore, it was easy to understand that, in the steady growth of their organisation, by far the larger number of societies was engaged in purchasing farmers' requisites, seeds, manures and things of that character. He did not wish to weary the meeting with details, but he could say generally that great savings had been effected by purchasing in combination. The Secretary of the Eastern Counties Farmers' Co-operative Association, which consisted principally of large farmers, reported they had obtained a reduction on various things of from 10 to 50 per cent. He could go through a long list of societies, all of which had effected similar savings upon their purchases for the year. But there was another form of saving to his mind even more important than the saving in price, viz., the enormous saving to the farmer in the fact that by this system he got what he really wanted to purchase; he got a guaranteed article of the best quality. Under present circumstances a farmer often bought an article which was very different from what it purported to be. One result of this advantage of combination was that the farmer would get a better yield, whether in the case of crop-producing or stock that was to be put upon the market. Co-operation for the sale of produce was a much more difficult matter. It had to be approached with the greatest possible care. Experience had shown that it was wise to commence from the very bottom, to organise small societies, so that they might grow and combine and co-ordinate with other societies, and in time be able to sell a large amount of the goods they produce. To attempt to start with a very large society was, in their opinion, and in the opinion of those who knew the subject thoroughly, the certain way to court failure. They had to organise the producer before they organised the distributor; to reverse that process was a mistake. Co-operation was not an easy matter to grasp, and sound principles must be laid down before they attempted to grapple with the more difficult problems. Men must first be accustomed to deal with the easier methods, and therefore they must not attempt in the first place to deal with the sale of produce.

Continuing, the President said that with regard to dairy farmers they had a society which had been selling large quantities of whole milk in London, the Eastern Counties Dairy Farmers' Co-operative Society, whose turnover last year was no less than £27,084. The Secretary of that society reported that milk, which at the time of its formation sold for 1s. 7d. per barn gallon in the winter months and 1s. 2d. in the summer months, would now fetch as much as 1s. 8d. and 1s. 4d.

The Newark Dairy Society and the Vicar's Farm Society had been sterilising milk and selling it in bottles with great success. A Lancashire society had been crushing oats for its members, and 2d. more per bushel was obtained from them than the ordinary market price. The Framlingham Co-operative Society had sold half a million eggs, and the price to the producer was about 25 per cent. better than he had previously obtained. With regard to fruit, the Evesham Growers' Association had established a central depot and had disposed of 1,000 tons of fruit and vegetables at prices very satisfactory to the producers.

Mr. Yerburgh drew attention, in a speech at the Annual General Meeting in 1905, to the fact that a society in Gloucestershire had found it possible to start an auction mart. The farmers there are now buying and selling cattle on their own account, and the profits that hitherto went to the auctioneer are now reserved for the farmers themselves.

An idea of the rapid growth of the Agricultural Organisation Society may be gained from the fact that, in 1903, there were 73 affiliated societies, and that, in 1904, the number had increased to 103, and, in 1905, stood at 113. The membership had grown from 4,500 to 6,500. The turnover of the societies had increased from £55,000 to £150,000. In 1904 only 18 counties were touched; in 1905 societies had arisen in 15 further counties—33 in all. Experience has shown that when one society is formed, and carried on as these societies are carried on, with business aptitude, and has proved itself to be a benefit to the farmers, other societies are rapidly formed in the district. The formation of one society thus means that other societies in the same county rapidly spring into existence.

How these societies prosper and what they can do is seen in the case of the little society at Beckford. Four years ago it started with a membership of fifteen and a turnover of £536, and a profit was made of £7 7s. At the end of two years the membership had increased to twenty-one, the turnover to £1,748, and the profit to £23. They had been faced with trade difficulties, and the profit was made after cutting everything down to the very lowest. In the third year, while only increasing their membership by one, the turnover reached £2,573, and the profit was £80. The capital was only £48, and a reserve fund of £30 had been created, and a bonus of 2½ per cent. had been distributed to the members.

One argument advanced against the success of the Agricultural Organisation Society is that its principles are only applicable to the case of the small farmer. The Ipswich Society, the President points out, is, however, a practical refutation of that suggestion. A considerable proportion of the farmers joining that society are what are known as large farmers, one member of the society farming no less than 4,000 acres. In view of the interest displayed by men in that position, it is evident that the co-operative movement is applicable also to the large farmer.

As regards the future of the society, the President continued, they had to obtain the cordial co-operation of everybody, and the support of all opinions. He had observed during his study of co-operation that, when farmers get into the habit of combining together, their interest is quickened; they look beyond their own immediate surroundings, and they begin to recognise that something is to be said for education in scientific agricultural methods. Shortly, then, co-operation is an invaluable prelude to the advancement of agricultural education. If they would get hold of that fact, then they could with confidence go to that very large body of men who do not understand co-operation at all, and point it out to them. A gentleman who had a wide knowledge of this subject and who was interested in agricultural education had put it to him and wished to consult Mr. Harris on the point, that it might be possible and after all advantageous to start co-operation first, and then go with education afterwards.

Hon. W. F. CLAYTON, M.L.A.
Late Minister of Agriculture.

Hon. W. F. Clayton.

LATE MINISTER OF AGRICULTURE.

In the *Journal* have been published portraits and short records of Mr. Edward Ryley, Mr. F. A. R. Johnstone, M.L.A., Hon. H. D. Winter, M.L.A., former Ministers of Agriculture, and to-day we have the pleasure of dealing similarly with the Hon. W. F. Clayton, M.L.A., the fourth Minister of Agriculture since the Ministry of Agriculture was instituted in 1897.

Mr. Clayton was born and educated in London; he came to the Colony in 1876 and took employment under Sir Liege Hulett. In 1878, in partnership with Mr. C. Ashwell, a farm was acquired and arrowroot and mealies were cultivated. Among the mealies were planted a few tea trees, and, as the seed became available, a tea plantation was begun. Under that class of crop he has to-day a large area. Later, in connection with his cousin Mr. G. A. Clayton, he started the Glenwood tea estate. After dissolution of the partnership the estate was sold to Messrs. J. L. Hulett & Sons, Ltd. Also, with Mr. Ashwell, he opened out the Fawsley Park estate, and on dissolving the partnership retained the original estate, "Island Farm," where he still resides. The new plantation was taken over by Mr. Ashwell. "Island Farm" is well planted with eucalypti, casuarina, etc., a cypress avenue being particularly beautiful. There are large orchards of citrus and other fruit trees. From the house there is a fine view of the Umvoti Valley and the river from which it takes its name. Up the valley was the scene of the fighting with Messeni. Altogether Mr. Clayton has been engaged in agriculture for 28 years.

Almost since his arrival in the Colony he has been associated with politics. In 1901 he was elected to the Legislative Assembly, and in 1903 became Minister of Agriculture. Among the more prominent features of his Ministerial work may be mentioned the following:—

Opening out of the Cedara Experiment Farm from its second year.

Erection and opening of Cedara School of Agriculture.

Starting of stud stock at Cedara.

Obtaining co-operation of neighbouring Colonies with regard to destruction of locusts.

Passing of Plants' Diseases Act, Burrweed Amending Act, East Coast Fever Act, Scab Amendment, Agricultural Development Act, etc.

Instituted the Land Board; opened up Winterton—30 settlers; opened up land in Zululand—some 170 farms allotted, and concluded arrangements for central sugar mill. Arranged for curing tobacco at Weenen. Arranged for Natal exhibits to South African Produce Exhibition now being held.

Held East Coast Fever in check until the rebellion caused quarantine regulations to be broken through.

On retiring with the Smythe Ministry in November, 1906, Mr. Clayton was presented with an address from the Staff warmly acknowledging the cordial relations which had existed during his tenure of office.

The following article on the beginning of the tea industry in Natal was contributed by Mr. Clayton to the *Journal* in May, 1898:—

"ORIGIN OF THE TEA INDUSTRY."

As March, 1898, may be called the coming-of-age of the Tea Industry in Natal, it is not inappropriate that a few words should find a place in the columns of the *Agricultural Journal* of the Colony regarding its past history, its development or growth, its prospects, and the *modus operandi* by which the manufactured article is produced.

I call it the "coming-of-age," because it was in March, 1877, that the seed was landed from which, practically, all the tea estates in the Colony have had their beginning. Not that the first plants of all were grown from this seed—for, I believe, that somewhere in the forties these were introduced from Kew by the late Mr. Plant, and located at the Upper Tongaat. Later on, too, the late Mr. Geo. Jackson, of Greenwood Park, grew a little tea of the China variety, and, I believe, sold a small quantity, but one can hardly call it a commercial venture.

Still, I suppose, these experiments served to establish the fact that the plant would thrive in the climate, and the larger and more important consideration as to whether it would grow to *pay* was left for others others to solve.

It is, I believe, generally admitted that, to be a success, a colonist must be a man of resource. Failure in one enterprise must not mean extinction, but renewed energy in a more promising direction. One has only to look at the prominent public men of Natal to find abundant evidence of this. Merchant becoming farmer, storekeeper becoming lawyer, and so forth; the moral being that the true colonist is a man of parts and not likely to be beaten. Thus it has come to pass that as one industry has failed another has sprung up phoenix-like from its ruins. I make bold to say that, had not the coffee enterprise proved so disastrously short-lived in Natal, the heading of this article would not have been written. But, alas! King Coffee died, and though Queen Tea came to take his place there are many who liked the old chap best.

It was, I think, early in 1876, that, through the instrumentality of the Lower Tugela Division Planters' Association, under the chairmanship of Mr. Hulett, the Government consented to defray the cost of transport of seed from Calcutta to Natal. The late Mr. James Brickhill, of the Natal Bank, was enthusiastic regarding the venture, and, what was more to the purpose, was able to render valuable assistance. Possessing friends at Calcutta, he requested them to procure seed of good *jat* or quality, and these, planted in boxes, were placed on board the Indian immigration ship "Umvoti," carefully watched, watered, etc., by Captain

Reeves, and eventually reached the wharf in capital order—most boxes having a few young plants already springing into leaf.

I was at Kearsney when the seed arrived there, and can quite vividly recollect the excitement and curiosity exhibited when it was handed over by Mr. J. M. Cooke (now of Goodricke, Laughton & Cooke), then a planter, who had kindly endured the discomforts of a wagon trip to Durban to secure proper care for the treasured seed.

Next came the distribution among the various planters, in proportion to their varied subscriptions to cost, and then placing of the seeds in nurseries. Messrs. Hulett and W. B. Lyle, sen., appear to have been the only two who "went into the thing" on business lines. Naturally, after so long a journey through the tropics, in a sailing vessel, even with the greatest care, a large quantity failed to germinate; but Mr. Hulett, the most successful, managed to rear and establish in his first field about 1,200 healthy plants, in 1878. These, by the way, are there to-day, as flourishing as ever. And now ensued a period of waiting, for all concerned, until the young trees yielded seed to extend operations, they being meanwhile carefully tended and cultivated, but not pruned—seed, not leaf, being the *desideratum.*

Gradually the acreage grew, and at last the time came when "plucking" could commence. In 1881-2 the first "crop" was manufactured, reaching the vast total of 545lbs., the whole of which was purchased by Mr. R. Jameson, to whom thus belongs the credit of first introducing the product to the consumer. The introduction was a success, and the youthful *débutante* speedily became popular.

Looking back, after a lapse of twenty years, when the aim is to get rid of as much blossom as possible at pruning time, in order to reduce to a minimum the quantity of seed drawing upon the resources of the tree during the flushing season, it seems almost ludicrous to remember how valuable it was then. The writer well remembers being allowed, as a favour, to gather, or glean, the fallen seeds from under the trees, obtaining, perhaps, ½ to 1 per cent. of plants therefrom. This will show that the enterprise was necessarily very slow of development at the onset; be it recollected also that the pioneers, with the exception of Mr. Brickhill, who made it his hobby, were men who had just been exceedingly hard hit by the failure of coffee, just when they had put all their capital into plantation and machinery. It speaks well for the energy and resource, before alluded to, of these men that they were able to carry their enterprise through to a successful issue.

Before seed was available for distribution, there were others who realised the possibilities lying ahead, and the writer and Messrs. Robbins and Ritchie, of Umhlali, commenced to plant as soon as possible, followed shortly by Messrs. Hindson, Balcomb, Thring, Peachey, and others; so that, in about ten years from the raising of the first plants, nearly 1,000 acres have been planted, all derived from the small shipment by the "Umvoti."

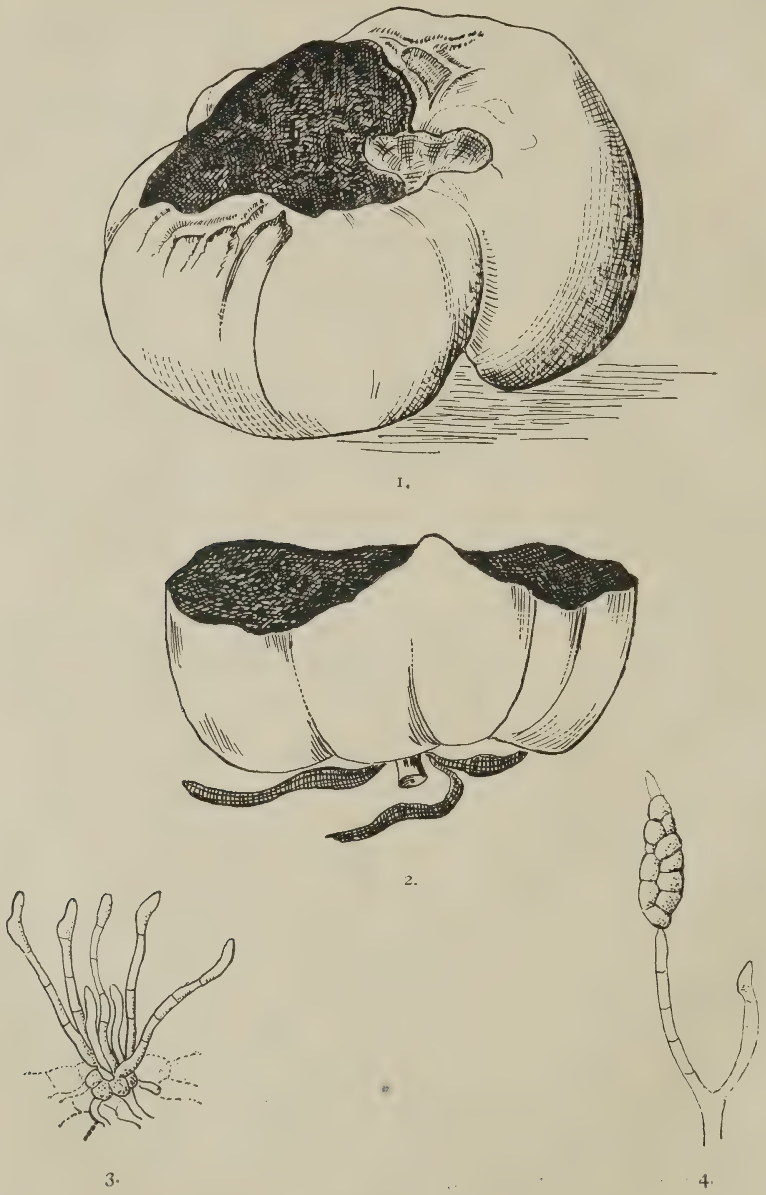


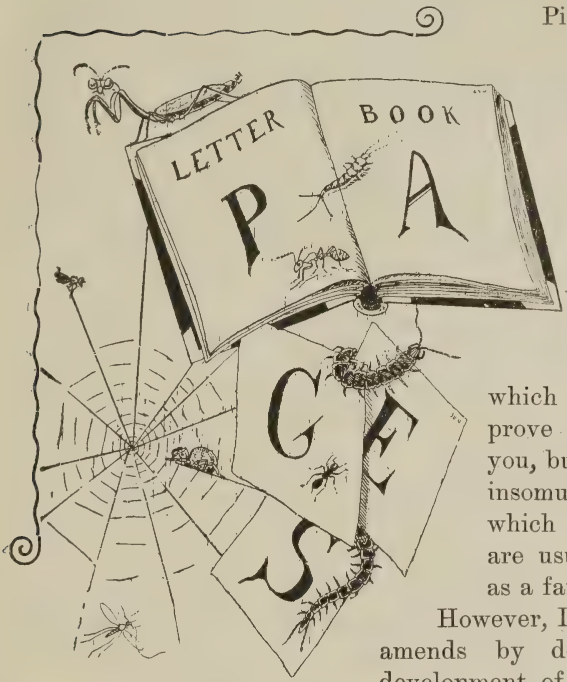
Plate I.

TOMATO ROT.

1 Tomato attacked by Tomato Rot.
2. Tomato collapsed from attack of Rot.
3. The fungus plant causing Tomato Rot, highly magnified.
4. A stalk of the fungus plant carrying a spore or seed, highly magnified (after Galloway).

Tomato Troubles.

Office of the Government Entomologist,
Pietermaritzburg, Natal.



Dear Sir,—

The specimens of Tomato plants and fruits accompanying your letter of the 12th instant, provided quite a collection of insect and fungus pests.

I do not suppose, for a moment, that the interest which these were to me will prove of much consolation to you, but that you must forgive, insomuch that those things which particularly interest me are usually troublesome to you as a farmer.

However, I will endeavour to make amends by describing to you the development of the fungi and the life cycle of the insects affecting your plants, and then enumerating the methods to be adopted for their prevention, or, where already present and doing mischief, the treatment to be followed out for their suppression.

TOMATO ROT.

(Plate I., Figs. 1—4.)

The specimen fruit which you send is suffering from the attack of the Tomato Rot (*Macrosporium tomato*)—to give it the name by which it is known to science. This fungus disease makes its appearance as a rule at the apex or flower-end of the fruit, when from one-half to two-thirds full grown. This spot is susceptible to attack because it affords the most sheltered situation upon the surface of the Tomato, for the propagation of the spores or seed of the fungus-plant (Plate I., Fig. 4), which give rise to the disease.

This fungus is a wound parasite, and the malady may appear on any part of the fruit where the skin is cracked or even minutely punctured.

Whilst the berry is most frequently attacked, the disease is sometimes present upon the stem and leaves.

The first warning of the trouble is a small, black spot, which starts either round the remains of the style, or a little to one side of it. This, whilst rapidly increasing in size, still retains its original and more or less circular outline, as shown in Fig. 1, Plate I. The dark-coloured roots of the fungus develop rapidly in the tissues, and, as the cells are destroyed, the diseased area first sinks a little below the surrounding and healthy surface. As the disease progresses, the tissues of the tomato collapse, the top of the fruit becoming much flattened, because the fungus generally extends squarely across the berry, from side to side, as shown in Fig. 2, Plate I.

In the latter stages of the disease, the surface of the fruit assumes a black, velvety appearance; and, finally, the entire fruit becomes shrivelled and dried up. The velvety clothing of the diseased area is due to the growth and fruiting of the fungus parasite, which sends out innumerable shoots of microscopic size, similar to those shown in Fig. 3, Plate I. At the apex of each of these shoots compound spores develop, and one of these is shown, very greatly enlarged, in Fig. 4 of the same plate. These spores part from the stems to which they are attached with remarkable ease, and are blown about in millions, settling upon the plants, and causing fresh outbreaks of disease.

The warm, moist weather experienced during the present summer has furnished ideal conditions for the development and rapid spread of the disease.

TREATMENT.

Before telling you anything about the measures of control to be adopted, I must first of all remind you that "Prevention is better than cure," an old adage particularly applicable to this case and, in fact, to all plant diseases of fungus origin.

Professor Bailey, in discussing Tomato Rot, says: "The small cherry and plum varieties are not attacked, and the old angular sorts are comparatively free. Training of the vines so as to admit of plenty of light is also useful."

Given suitable soil conditions, the great point to be observed is to train the vines to stakes, pruning them lightly so that plenty of light and air may be admitted. Plants so trained and pruned do not favour the development of the fungus as much as those which are neglected and allowed to run along the ground, and for this simple reason; by the admission of light and the free circulation of air among the plants, they dry off more quickly after rain or heavy dew, and thus the conditions necessary for the development of the disease are rapidly eliminated. Furthermore, should plants become infected, they will admit of ready and more thorough treatment.

When spraying is resorted to, Bordeaux Mixture should be the agent employed, applications being made at intervals of a week or ten days, until no further infection is feared. Generally speaking, in spraying tomatoes, it is advisable to combine with this fungicide some insecticide, such as Paris Green or Arsenate of Lead, and thus meet the attack of any chewing insects which may be present.

If your varieties are at all susceptible to this disease you will find that repeated sprayings with either Bordeaux Mixture or Ammoniacal Carbonate of Copper as a preventative will resolve itself into a very paying proposition.

Soil conditions have an important bearing upon the successful culture of tomatoes, more especially as regards their susceptibility to diseases of fungus or bacterial origin, and their resistance to such.

The heavy use of stable manure, so that the soil contains fertilising matter in excess of the demands of the plant, especially if in a state of active decomposition, greatly aggravates disease, and tomato plants are more subject to blights on an ill-drained soil than most other plants.

TOMATO LEAF BLIGHT.

You will have noticed that one of the plants which you sent me, besides being infested with the bug to which you draw my attention, is suffering from a disease somewhat similar in appearance to the Potato Blight (*Macrosporium solani*) with which you are so familiar. This is the Leaf Blight of the tomato, and is frequently met with here in Natal. The specimen which you submit very clearly shows the effect and appearance of the disease. Brown, felted spots appear on the under side of the leaves, as the first manifestation of the disease. These, of irregular size and appearance, gradually spread, whilst, at the same time, corresponding areas on the upper side of the leaves assume a yellowish colour.

As the disease progresses, the affected parts become dark brown to nearly black in colour, and the finale is seen in the complete shrivelling and drying up of the foliage, so that nothing but the naked stems of the plants are left.

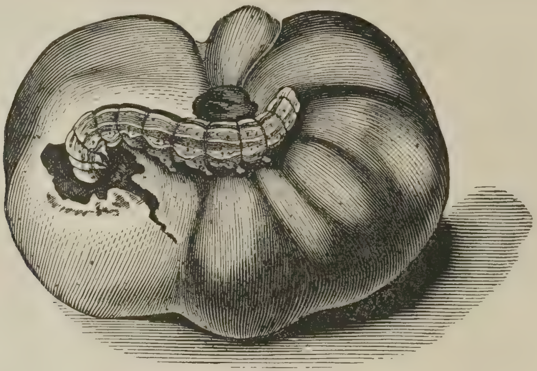
This effect is due to the breaking down and destruction of the cellular tissue of the leaf by the mycelium or root system of the fungus, which has nourished itself thereupon.

The spots owe their origin, in the first place, to the germination or growth of a single seed or spore of the fungus, the root of which penetrates into the leaf through one of the numerous air-pores; and, long before they have become of any remarkable size, each fungus plant, which has so arisen as a parasite upon the foliage, is producing countless spores, through whose agency the infection is spread further afield.

Blackish stripes are often present on the stems of the diseased plants.

TREATMENT.

You should endeavour to prevent the appearance of this blight by frequent application of Bordeaux Mixture or the Ammonical Copper Carbonate solution. You are well acquainted with the preparation of



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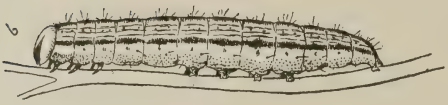

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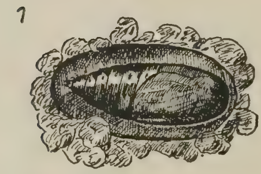

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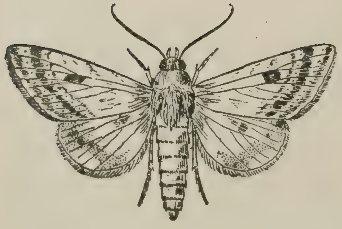

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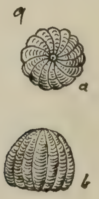


2.

PLATE II.

TOMATO WORM.

1. Tomato Worm attacking fruit.
2. Eggs of Tomato-worm Moth (*a*) Viewed from above; (*b*) Side view (highly magnified).
3. Full grown caterpillar (natural size).
4. Chrysalis or pupa in earthen cell or cocoon (natural size).
5. Adult moth (natural size).

Bordeaux Mixture, but you may not be so familiar with the Copper Carbonate spray, so I am giving you the recipe here.

Copper Carbonate	5 ozs.
Ammonia (Strongest Liquid)	3 pints.
Water	50 galls.

Mix the Carbonate of Copper into a paste with a little water. Add the Ammonia, and pour the resulting blue liquid into fifty gallons of water.

This is, as you see, a much more easily prepared spray than Bordeaux Mixture, but I myself much prefer to work with the latter.

Up to the present, I have been discussing the fungus troubles of your plants, and, although I have only mentioned two of these, you must not imagine that these are the only diseases affecting the tomato, as there are a number of others, including two of a bacterial nature, which are capable of doing serious injury. However, as I have not yet met with either of them in Natal, no object will be gained by discussing them here.

TOMATO INSECTS.

We now come to the insects attacking the tomatoes, and of these you furnish two examples on the plants you send.

TOMATO WORM.

Heliothis armigera.

(Plate II., Figs. 1—5.)

The caterpillar you observed eating into the fruit of the tomato is shown in Plate II., Fig. 3. It is from one to one and a half inches in length, pale green or dark brown in colour, and characterised by stripes of a darker colour running the full length of the body. This is the larval form of a moth (*Heliothis armigera*), an insect notorious for the damage which it does to cotton in America, where it is known as the Cotton Boll-worm, and under which soubriquet it goes the world over. Its host-plants are many, and, besides being quite common on the tomato, it will be familiar to you as the Striped Beard-grub of the mealie (of which pest you sent specimens last year).

Plate II. illustrates the various stages of the insect, from the egg to the adult. Fig. 2*a* shows the aspect of the egg when viewed from above, and 2*b* is a side view of same. These eggs are laid by the adult moth on the leaves of the host plant, and in the course of a few days hatch small caterpillars, which grow to the size of that shown in Fig. 3. It is during this stage of development that it is so injurious, and it is seen eating into a tomato in Fig. 1. On reaching full growth it enters the ground, there pupates in an earthern cell or cocoon (Fig. 4), and from this chrysalis ultimately emerges the moth shown in Fig. 5.

TREATMENT.

The latest experiments, carried out under the direction of Mr. C. P. Lounsbury, Government Entomologist of Cape Colony, go to show that the use of Arsenate of Lead has been attended with the most success when directed against the larvae in the fruit. This is, as the name implies, an arsenical poison, but no danger of burning the foliage—as is the case when free arsenic is employed—may be feared. It should be applied at the rate of three pounds to fifty gallons of water, and I would recommend that Swift's brand be used. This is a most desirable insecticide and one which I would like to see more generally in use for plant-eating insects, such as caterpillars, beetles, etc. Paris Green may also be applied, but, upon the whole, it is preferable to use the Arsenate of Lead.

TIP WILTING BUG.

The second insect pest is a plant-bug. A troublesome and ever-spreading weed, the tree tobacco, probably *Solanium gigantium,* is well known to children about Maritzburg as the "bug plant." This because this species of bug breeds upon it in enormous colonies. Indeed, the bugs are so numerous that they completely clothe the succulent stems for 20-30 inches. The creature, despite its abundance, does not seem to suffer from any natural enemies, nor does it harm this host particularly. It has always seemed remarkable, during the several years that this creature has been under casual observation, that it had not taken to cultivated plants. Lately, however, attention has been drawn to it several times, upon both tomato and chilie plants. In both instances the bugs damaged the plants, and were particularly mischievous in their effects upon the latter. What renders the observation more remarkable is that, in the case where the chilies were suffering so severely, they were entirely surrounded by tomatoes, which were free—an indication of the preference of the insect for chilies over tomatoes.

TREATMENT.

Hand-picking is the most practicable method of dealing with this pest. It should be done in the early morning, when the insects are lethargic in their movements, and may easily be caught. Quite the simplest method of killing the bugs is to provide a tin partly filled with water, on the surface of which a film of paraffin or some other oil is floated. When dropped into this, the oil enters through the several breathing holes or stigmata of the body, and kills the insects readily. Whilst hand-picking the insects, a good look-out should be kept for their eggs. These are laid in clusters, upon the under surface of the leaves, and much resemble a group of small, dark-brown, glass beads. The leaves carrying the eggs should be picked off and dropped into the tin, along with the bugs.

I think that I have now given you all the information which you require, and conclude with the assurance to you that it is always a pleasure to advise you on these matters, as far as lies in my power.—Yours faithfully,

ALBERT KELLY.

Co-Operative Banks for Agriculture.

Without credit, business relations are practically non-existent. Credit is the bond that holds together the whole fabric of modern trade and industry, and renders possible business enterprises on every scale of magnitude. Unfortunately, however, whilst the man in town is able to command credit much or little according to circumstances, he of the soil is handicapped by force of circumstances from participating in that help to enterprise and successful business.

The chief difficulty that has had to be overcome in organising some suitable credit system for the agriculturist, has been the fact that short credit, which is so largely the rule in ordinary business relations, is of little or no use to the farmer. The farmer, from the very nature of his business, requires extended credit; and money obtained for long periods from the ordinary banks is too dear for the farmer's requirements. In addition, he is, ordinarily, not in a position to command credit: he has nothing to offer as security such as a banker would be willing to recognise.

Realising the position of the farmer in this respect, several successful attempts have been made to ameliorate conditions and provide credit on easy terms by the establishment of various forms of agricultural banks. Raiffeisen led the way, and he is justly regarded as the father of the movement. Others have followed—some adopting the Raiffeisen principle, others instituting schemes of their own, according to the needs of their respective countries. In England, Mr. Henry Wolff may be regarded as the leading authority on all matters connected with agricultural credit; and his book on agricultural banks is the leading work on the subject. A pamphlet by him, entitled "Co-operative Banks for Agriculture," has recently been issued by the Agricultural Organisation Society of Great Britain. In the direct, pithy style that characterises it throughout, it sums up in a few words the position of the agriculturist in regard to credit. "Agriculture, both small and great," says Mr. Wolff, "though plainly requiring working capital, such as credit can supply, is not in the same advantageous position as other callings to command credit—in the first place because it turns over its money very slowly, and accordingly requires its credit for very much longer than what ordinary dealers in money like to part with it for; and, next, because the method of agriculture are distinct from those of all other callings, and the security which agriculture has to offer, though ample in itself, is not such as a commercial banker could readily appreciate and honour."

Continuing, Mr. Wolff draws attention to the advantages of the co-operative credit system. Co-operative credit on a share basis, he says, has this advantage, that it can be applied *anywhere*. Unlimited liability, which is the mainspring of the Raiffeisen system, is not a suitable form for carrying on any considerable business, being applicable only to very restricted areas and small purposes, under restraints which in a larger sphere would become hampering.

On the other hand, unlimited liability banks render it possible to reach lower levels of poverty and distriess, in addition to their educating and character-forming influence.

But without funds, Mr. Wolf says, "even the most excellent machinery would be useless." Continuing, he says: "Funds, evidently, there must be. But I am a little troubled at finding you rather habitually seeking for them in quarters to which one would think that our boasted British self-reliance would turn only after discomfiture elsewhere. You ask for private patrons' largess, for Government subventions, for advances—appealed for under cover of foreign precedents, which are, in truth, no precedents at all—from the Savings Bank. But why should you go down on your knees at all to the Chancellor of the Exchequer, begging him for favours, when you have absolutely the same facilities for obtaining savings bank money within your own reach? It is like a child crying to its nurse in the next room for milk which is actually placed before it on the table. Why is it necessary that the savings deposits that you want should laboriously circulate through the coffers of the National Debt Commissioners before reaching you—which, by such circuitous route they never will? You have better opportunities for collecting that money at your command than the Chancellor of the Exchequer, and your own interest, as well as the task which you have set yourselves of raising your people, at any rate, materially, demand that you should use them, and promote thrift. Mr. Gladstone has frankly owned, after he had carried his point, that in introducing his two Savings Banks Bills, which, as Acts, secure to the Chancellor of the Exchequer the full disposal of all savings bank money, he was pursuing an officially selfish object—about which he was afraid to be questioned, lest it should be revealed—namely, to give the Chancellor of the Exchequer 'a strong financial arm,' and to make him 'independent of the money market.' That is precisely what you want. You want the money. Why not collect it? You have greater advantages than the Exchequer. You know your people, and are known of them, and trusted by them as being men of their own choice.

THE SECRET OF SAVINGS BANK SUCCESS

is, as the Nestor of the great trustee bank of Glasgow, Mr. Meikle, has deposed, 'facilities.' Being on the spot, you are in a better position than the Government Savings Bank to provide such. You know what are the most convenient hours, the most appreciated methods. You can send round collectors to snatch up pennies as they come in, emptying the stocking and the drawer, and as Schulze Delitzsch said, that it was your duty to do, sweeping the district bare for your benefit of all its spare cash. Having more remunerate employment for your money, you can yourselves pay a higher rate of interest. You do not seem to have any idea what a marvellous gift co-operative banks have of ingratiating themselves with local people as savings banks. But that is what forcibly strikes everyone who visits them abroad. Therefore Lord Avebury was quite right when, in 1887, he recommended them to the House of Commons as model receptacles for savings. You may observe it at their very first start, in their most feeble infancy. In Cyprus a friend of mine has started fourteen village banks, as nearly Raiffeisen as he could make them under adverse circumstances, in as many wretchedly poor villages. Within one year their savings deposits averaged £200 per bank. The collective amount represented more depositors, and totalled up to a higher figure than all that the far more pretentious Government Savings Bank, working over the whole island, could boast of after five or six years of its existence. In India the same Registrar, under the Act of 1904, who about a year ago advised me that among the wretchedly poor rayats of his Presidency savings deposits were absolutely out of the question, now states in his last annual report that savings deposits are coming in nicely, that the members of his banks have bound themselves by rule to deposit each year so much for every rupee rent paid, or for every plough employed. 'If this continues,' so he adds, 'and there is every prospect that it will, the problem of financing these banks will settle itself.' Let me tell you of Germany. The great 'Imperial Union' of agricultural co-operative societies began, like yourselves, by looking for assistance from the outside. The Government came to its assistance, endowed a State central bank with £2,500,000 of money, directing it to deal out advances freely at less than market rate. The result was that the banks grew up very epiphytes, accumulating little capital of their own, as a report presented to our last International Co-operative Congress has shown. However, the State bank could not go on paying out money at less than it cost it to buy. It became more exacting. It was met with an indignant outcry, of which I was a witness. However, the lesson was taken to heart. The banks laid themselves out for collecting savings, and their annual takings of such now amount to

£5,000,000 IN EXCESS OF WITHDRAWALS.

That is for two Unions, numbering about 1,750,000 members. The managing director of the State Central Bank, which acts as banker for many co-operative societies and some savings banks, stated about two months ago that he then held on behalf of such bodies no less than between 80 and 90 millions sterling of savings deposits. Yes, gentlemen, these accumulations of co-operative cash run into money! Some eighteen months ago Mr. Chamberlain spoke in a lamentable voice of £100,000,000 a year that he would like to have to distribute in wages among British working men, as if that were a far-off achievement. But £100,000,000 is just the sum that about 900 co-operative banks of the Schulze Delitzch type—including some very large ones—keep circulating year by year in fructifying employment. In the last full year reported upon (1905), 921 such banks among them lent out £150,000,000. At least one-fourth of that goes to agriculture. Do you know how the German Raiffeisen banks stand with regard to their central bank? You will say that they are deeply in debt to it. They have, collectively, a goodly sum standing to their credit. A little while ago it was £700,000. It is they, at present, who supply their central bank with funds, not *vice versa*. And where do those funds go? Please mark this! To the host of agricultural productive societies, which profitably convert agricultural produce into more marketable and more valuable commodities, and to which in great part German agriculture owes its improved condition. Is there not a valuable hint in this for our Agricultural Organisation Society? It is the banks which find the money for establishing co-operative dairies, beetroot sugar factories, potato distilleries, sourkrout factories, jam and pulp factories, vintries, granaries and the like, repaying themselves out of the produce. In respect of dairies, the tax levied upon produce not long ago was, and probably still is, a farthing per litre (⅞ths quart) employed. All this, and the large posse of supply and other co-operative societies German agriculture distinctly owes to the banks. Thirty-seven years ago, when I returned from Germany, having farmed there some land that I had bought during several years, there were as good as no agricultural co-operative societies in Germany. We had some few here, about nine county societies for the supply of manures, and the Agricultural and Horticultural Association in its beginnings. On the strength of their results I wrote a little article, which I thought would be useful, and which the Prussian Ministry of Agriculture gladly inserted in its official organ. But the result was nil. Some years later the banks came on the scene, and as

BY A MAGIC TOUCH OF A MODERN MIDAS THE LAND BECAME FERTILISED WITH GOLD,

quickly covering itself with agricultural co-operative societies of all sorts. There are more than 20,000 such societies of an agricultural character only, among them nearly 14,000 banks. The co-operative dairies numbered in October, 2,950. We have 14. I have seen steam threshing machines for common use belonging to men who had never been called upon so much as to put their hands into their pockets for even a stiver to purchase them with. The bank had bought them, and recovered the value out of their own proceeds.

"Do not we want something of the same sort? It can house us, too, and cut up estates into small holdings. There are co-operative societies which do that to perfection.

"The collection of savings deposits ought, therefore, to be the main supply of your funds, the pillar upon which you rest your system. In making it such you will be rendering a great service to the country as well. However, no bank can expect to start with a large supply of such deposits, and there are sure to be times when, even if it have such, it will require to make a draft upon other capital."

As has been pointed out, the farmer is not, as a rule, in a position to command credit, from the fact that he has little security recognisable as such by commercial bankers. In agricultural co-operative credit banks this difficulty is easily overcome. " 'Security' does not necessarily mean so much money invested in Consols," Mr. Wolff reminds us, "but a certain guarantee that you can give to your lender (who may, of course, be a depositor) that he will be repaid"; and, further, he says: "Personal security is by far the most convenient for business purposes, and also the most educating. In a co-operative society you have the very best means at your disposal for giving and obtaining security of a personal sort. For you have a selected membership to begin with, selected by yourselves, with the very object of credit in view, and if you only devise appropriate machinery, by means of the touch subsisting among members, and the hold which every member as a class-mate and neighbour has upon the other, and of members' power of watching the employment of each loan, you may be sure that you will adequately secure yourselves against anyone that borrows from you; whereas, by pledging to everyone who lends to you your collective share capital, or in one case even your collective possessions, you provide ample security for him. It is the creation of an intermediate body, standing between borrower and lender, bound entirely to the former by its common interest, yet bound also in each single case, in virtue of the liability of everyone engaged, to hold the debtors to their duty, on which really the whole structure rests. It is the system of Scotch cash credit carried very much further and democratised. Scotch cash credit, which has done such wonders for Scotland generally, and specifically for Scotch agriculture, was, in an inquiry held by a Lords' and Commons' Committee in 1826, explained to be safe, because to every borrower there were three or four sureties, liable for him and acting as sentries to him, closely watching him and holding him to his obligations. In co-operative banking you have the same sentries, and, in addition, you also have the security of the entire society."

With such security there is no risk. It is personal security; and its moral influence upon members of such a bank is inestimable.

Mr. Wolff's interesting pamphlet ends: "When your banking has grown strong it is to be presumed that you will have

YOUR OWN CENTRAL BANK,

formed by the banks themselves, in which surplus and want of various banks will balance one another, and which, on the strength of your united security, will be able to tap the money market.

"But for starting, probably a guarantee will always be best, just because it is a guarantee and not a loan, which means that it places the borrower's liability foremost and the guarantor's only second. The danger to these banks to be apprehended from all financial help given is that such help may become a gift, and so blunt the sense of responsibility which it is your interest to keep keenly alive. A lender may reconcile himself to the loss of money already dealt out. A guarantor will want to know why he is called upon to pay before parting with his money. And this is most useful for the bank itself. It may be made to anticipate that Union inspection upon the utility of which I have already dwelt.

"Only, if you have guarantors—who need not necessarily be members of the particular bank, but may very well be outsiders, forming possibly a Guarantee Committee for some distinct district—do not, as you value your bank, make the guarantee a pretext for asking for privileges. There is one privilege which you have a right to ask for and which you will benefit the bank by insisting upon. That is full control, examination of the books, restraint upon unsafe action. The more important your guaranteeing body is, the more effectively will it be able to apply the control of checking, which is useful for the bank because it is essential for its success that in it everything should be kept strictly business-like. That is why I suggested guaranteeing committees, which might employ trained inspectors. An Endowment Society formed by independent capitalists might render the same service.

"I purposely do not call it a Central Bank, because for a considerable time there could not possibly be any banking for it to do. Money would be going all one way, and to call an institution under such circumstances a Central Bank might be to mislead people, and might very possibly damage the movement. There can, on the other hand, be no harm in a Central Endowment or Advance Society, provided that it is kept fully business-like and strict in applying inspection and control, and that it makes it its avowed aim, in due course, by the admission of banks as shareholders, to convert itself into a bank of banks. There is danger in mere patronising endowment which wants to be guarded against.

"I think I have shown that co-operative banks may be richly useful, that they are not difficult to establish, and that they may be made absolutely safe. As a means of making them so, let me sum up in a few words

THE MAIN POINTS OF YOUR TASK.

You have to find security, and that security must be absolute; to provide it you must submit to any engagement which may prove necessary. You substitute service, vigilance, painstaking control for a tangible pledge. Your collective liability is your creditors' security. Your control is your own. You cannot get away from these fundamental conditions. *With* them you may accomplish anything. The possibilities of co-operative banking are, as the late Ernest Brelay has put it, "illimitable." But break away from principle, take liberties with necessary safeguards —which it is very easy to do—and your substantial structure becomes a mere house of cards; the treasure for which you look, delusive rainbow gold. In the interests of British agriculture, which wants a lift, I hope that much, very much, will now be done for the promotion of co-operative banking, on sound, approved, self-help lines, and if that is done I do not hope, I am confident, that your action will be crowned with rich success, and that you will be found to have rendered an invaluable service to our native agriculture."

Readers of the *Journal* interested in the formation of agricultural banks are referred to the article on "Agricultural Credit Banks," by Mr. E. T. Mullens, in the October and November issues of the *Journal*, 1905; also to Mr. Wolff's work, "Agricultural Banks: their Objects and Uses." The Department has ordered a number of copies of Mr. Wolff's book, and intimation of their arrival, and terms of disposal, will be given in the *Journal*.

Age of Cattle at Shows.

NOTHING casts a greater cloud over the proceedings at shows than the suggestion that there has been something doubtful in the get-up of an exhibit, or that there has been a false statement made in regard to age or date of shearing, etc. Nothing is more horrible than for an exhibitor to be placed in a position of attempted deception, and it is not to be wondered that he will raise Cain in the endeavour to refute all unjust accusations. Fortunately, among the large number of shows held throughout Australia, underhand practices or false statements are hardly ever heard of, but nevertheless it is important that agricultural and pastoral societies should take every precaution to state the conditions pertaining to each class so that there can be no ground for the slightest doubt or complaint. At the last Sydney Royal Show trouble occurred in the fat cattle section, owing to the ages of some of the entries being disputed, and as a result we are glad to see that special regulations have been drawn up to prevent the occurrence of this in future. The age of all cattle is to be computed up to the 1st of March, 1907, and full pedigrees must be given on the entry form, except in regard to grade dairy cattle and fat cattle. Exhibitors of fat cattle must state the name of the breeder, where the cattle fattened, and what food they have been kept on during the year, and they must declare that the animals entered have not appeared in the same class at any previous show of the R.S.A. of New South Wales. A very satisfactory and important by-law is that instructing the judges to refer all cases of doubtful ages to the stewards before the awards are made, and the stewards may then call in the society's veterinary surgeon to report right away. The matter will then be settled by the council, whose decision will be final. We do not anticipate any future trouble of this kind, but we commend the adoption of regulations for so promptly dealing with disputes that may arise. It is most unsatisfactory to postpone the inquiry till the show is over, because the wrong exhibits have posed as prize-winners during the currency of the show, and the rightful competitor has suffered an injustice. The time to deal with any doubtful entries is directly suspicion arises, before any awards are made, even if the progress of judging is delayed in consequence.—*The Pastoralists' Review.*

"Horsesickness."

BEING THE SUBSTANCE OF A LECTURE ON THIS SUBJECT DELIVERED TO THE INANDA AGRICULTURAL ASSOCIATION.

By H. WATKINS-PITCHFORD, F.R.C.V.S., F.R.S.E.

IN dealing with the history of South African horsesickness we cannot, as with such diseases as tuberculosis or rinderpest, avail ourselves of the observations and works of men of bygone ages, our earliest disease-history being comparatively recent and dating only from the earliest decades of the eighteenth century. The first record of the existence of the disease in South Africa is in 1719, when it seems to have assumed a spreading or epizootic character and swept over Cape Colony, destroying a large number of horses.

It is probable that the disease existed before this, but did not attain any great dimensions owing to the thinly settled state of the country and the consequent absence of the inseparable friend and servant of man the horse, which does not seem to have existed in South Africa before its introduction from Java about 1650 by the Dutch East India Company.

The earliest documentary evidence I have been able to procure as to the existence of Horsesickness in South Africa is contained in a letter written by a Mr. T. Moodie from Fort Beaufort, in the Cape Colony, dated in March, 1856. This gentleman now probably long gathered to his fathers, says in the course of his letter:—

"I have never seen Horsesickness before but often heard of it. In 1839 my father lost upwards of 100 at Groot Vander's Bosch, and in 1819 he also lost a great many. In the year 1801, called the year of the 'great Horsesickness,' I have been told that the whole district was cleared of horses and that it was nearly as bad as 1780."

This letter then affords us a brief glimpse into the past, and is all the more interesting as showing us the difficulties experienced by the South African horse-breeder as far back as the time when George IV. was on the throne.

The horse is, of course, an equine closely allied to the Zebra (with its three species, Equus Chapmani, E. Burchelli, and E. Zebra or Quagga, Burchell's and the common Zebra) and South Africa has been, as we all know, from time immemorial the home of this species of Equidae. It seems therefore not a little strange that so closely allied a genus as our domestic horse should have found existence in a natural condition apparently impossible in the Sub-Continent. The laws governing the questions of Immunity and Susceptibility seem at times very strange to us, and an apparently slight racial difference is sufficient often to constitute the impassable barrier. We may ask why the white rats is insusceptible to Anthrax when the brown or black rat readily succumbs, or why the sheep of Algeria can resist the same disease so fatal to sheep elsewhere all over the world; and many similar seemingly inexplicable problems will confront us on the fringe of the extraordinary complex subject of immunity.

However this may be, we find that the zebra can exist in localities where natural conditions of existence are impossible for the horse, and incidentally it has frequently occurred to me that possibility exists of utilising this natural resistive power of the zebra in the study of the disease horsesickness.

When one considers the apparent absence of natural barriers to the migration of the horse from the northern part of the Continent (where—if not indigenous—the species has at least existed from time immemorial) it does not seem irrational to suppose that the disease which we know as Horsesickness has been responsible for this repression of extincti of the wild horse from South Africa.

Since the time of the first known introduction of horses by Europeans, now some two hundred and eighty years ago, the disease has levied a heavy annual toll upon South Africa, in some years mild in its incidence and in others denuding a whole country-side of its horses. Edington (quoting doubtless from official papers) cites an outbreak of this latter sweeping form of the disease which in 1854 destroyed 64,858 horses in Cape Colony alone.

Of the distribution of the disease throughout the whole of the African Continent south of the Equator there seems no doubt.

Some years ago I was able to obtain through the help of our Colonial Office a number of Consular Reports, showing, on the East Coast, the prevalence of the disease as far north-east as Zanzibar and from S. Paul de Loanda on the north-west.

The Consul General from Old Calabar, which is even north of the Equator, reports the prevalence of the disease "throughout the territories of the Protectorate," and from Angola the official report states that the disease is "most deadly" and that "horses die shortly after being landed." Thus we see that a vast tract of country exists in Central Africa from which the natural horse would seem to have been eliminated by some destructive agency, while as we know he can flourish to the north of this deadly zone and in the south the association with man, which means stabling and care, affords at least the possibilities of existence.

From this rapid consideration of the geographical distribution of the disease the transition of thought to climatic influences is natural.

While in regions around the Equator the disease, as we have seen, is active at all times, we shall notice as we come south—that is as we approach more temperate latitudes—to that degree, the disease Horsesickness tends to become periodic or intermittent throughout the cooler months of the year, and as we leave Mashonaland and Matabeleland the country south gradually becomes free from the risk of Horsesickness throughout certain months of the year.

When in Salisbury, Rhodesia, I saw a typical case of Horsesickness in the depth of winter, and was informed by Mr. Grey, then Chief Veterinary Surgeon, that such cases were by no means uncommon. Even in Natal many must have heard of such cases (especially on the milder Coast belt of the Colony), but as a general rule Natal and the Cape Colony enjoy an almost entire immunity during some six months of the year. In fact, it may be laid down in general terms that the disease Horsesickness is connected with the *mean* temperature of the district. Exceptions, of course, occur, but we may say with confidence that the incidence of the disease is greater upon those districts possessing, by their geographical characters, milder and more sub-tropical conditions of climate.

Further than this, abundant evidence is forthcoming as to the intimate connection of outbreaks of the disease during or following seasons of exceptional rainfall. Coastal districts, the Tugela and Umfolosi Valleys, swamps and districts well-watered and wooded are especially liable to its ravages, and the occasional outbreaks on the high veld of the Interior have a direct relation to the rainfall and probably the level of the *subsoil* water.

Humidity and warmth then are accepted factors in the production of the disease, or, if not concerned directly with its production, are at least invariably associated with that sweeping epizootic form of the disease which occasionally devastates our stables.

Most of you gentlemen will, I expect, have heard of, even if you have not personally met, cases of the disease occurring in the depth of winter and in places where conditions of warmth and moisture can hardly be said to obtain.

I think such instances are authentic and would be inexplicable in the absence of our recently attained knowledge as to the length of time the germ of the disease can remain latent within the system of the horse, just, as we all know, the germ of malaria will remain quiescent in the system of man for weeks and months and suddenly spring into active evidence heralded by the well-known shivering and fever.

Cold, exposure, exhaustion and other depleting and enervating causes will often precipitate a smart attack of malarial fever in a person who perhaps *many months previously* had the misfortune to become infected by the disease.

That the germ of Horsesickness can lie dormant in the system of the horse for a lengthy period, longer in fact than the usual period of incubation, I have frequently proved in my experimental work with this disease; and this fact is the more interesting when one considers the usual rapid and certain symptoms produced by the disease when gaining access to the horse's system in the usual way.

This lengthy period of incubation has not, I believe, been noticed before, and I shall refer to this fact again, but as we see it may have some bearing upon the question as to those infrequent occurrences of the disease at other times than in Horsesickness season.

It is not, however, to this or any other of the more speculative and theoretical questions attending the study of the disease that I would ask your attention.

As you know, I have in the past expressed my opinion as to the cause of the disease in the form of official reports, etc., and probably most will have thought over the matter more or less since reading or hearing of these expressions of opinion on my part.

I believe that South African Horsesickness is spread chiefly, if not solely, by means of suctorial insects, and the conclusion that such are flies (and probably mosquitoes) the rapid transmission of the disease would seem to warrant.

To deal with this point first. I will endeavour briefly, and as clearly as I can, to enumerate the possible modes of infection, by which, of course, we understand the manner in which the disease is contracted by horses.

The usual manner of contracting a disease is by contact, *i.e.*, contagion. A very short survey of the disease will suffice to show us that simple contact or association (however close) of a sick and healthy horse does not produce Horsesickness. Examples of this method of infection would be found in rinderpest, small-pox, etc.

For every one instance in which animals in a stable have taken the disease simultaneously, probably five hundred instances could be brought forward showing that horses on either side of the sick animal remained perfectly healthy.

In fact, I am justified in being dogmatic on the point and in saying that Horsesickness is *not transferable* from one horse to another.

Does the horse then pick up the germs of the disease with his food, or water, or does he breathe them into his system as he inspires?

Here we arrive on more debatable ground—ground which as we all know has been very well traversed by lay and professional man alike for some three or four generations past in South Africa.

It is very interesting to refer to a number of conjectures on the cause of the disease which were furnished to the Governor of the Cape Colony in 1855 by various District Surgeons, Surgeons of Regiments quartered in South Africa, and Civil Commissioners. A great variance of opinion is evident. For instance, Doctor Soek, writing from Clanwilliam in October, 1855, states his opinion that the disease is caused by "a deleterious miasma in the air which, being inhaled by the horses, does not cause inflammation and suffocation, but, taken up in the blood and the ramification of the bronchia, acts as a poison by destroying the vitality of the blood." The practical advice given by this writer to prevent the disease is as follows:—"The wild garlic is to be recommended to travellers who travel early in the morning or late in the evening, and especially those passing over low marshy ground, to have a small quantity of the garlic pounded and tied in a small piece of rag and this rag affixed to the bit of the horse."

This suggestion for the prevention of the disease is of more value than the recommendation of Doctor Cooper, of Somerset East, in a letter dated October 5th, 1855, in which the worthy medico advises in all seriousness as follows: "Let the patient be hung up by his hind legs from the beam of the stable three or four times a day for a few minutes so that the discharge from his lungs may run out mechanically."

The general concensus of opinion professional and lay about that period seems to have been that miasma, morbid poisons, sudden changes, poisonous herbs, honey-dew, bad air, oppressive atmosphere, etc., were responsible for the disease, whilst the Staff Assistant Surgeon, writing from Fort Peddie in 1855, states that "cold is the exciting cause of 'the disease,' " an opinion which those living on the warm Coast-belt will be hardly likely to endorse.

Bitter and sticky dew mists and an unaccountable prevalence of fine cobweb gossamer on the veld were considered by people of 1855 to be the cause of the great outbreak in that year. A. M. Bayley, writing in 1856, says, "these webs were unusually abundant everywhere in the early part of 1855, and could not fail to attract notice." Such appearances were a marvel to those days long prior to 1855, as far back at any rate as the time of Chaucer, who sang:—

"As some sore wonder at the cause of thunder
On ebb and flood, on *gossamer and mist*,
And on all things, till the cause is wist."

But perhaps the strangest of all strange hypotheses which have been advanced to account for Horsesickness is that which was contained in a letter written by a medical man from Genadendal, in which the disease is attributed "to the atmosphere remaining behind the earth in its rotation." No wonder amidst such bewildering conjectures and theories the pious old Boer shielded himself behind his fatalistic philosophy, and in the frequently devastating epidemics of Horsesickness saw but the chastening hand of Providence.

As we have seen, the disease, by general consensus of opinion, is not contagious, *i.e.*, it cannot be caught by the close contact of a sick horse with healthy ones. Neither is it directly infectious, scattering the germs of the disease about in mangers, horse troughs, clothing, etc., as in the case of glanders. We are all agreed, I think, on these points and confirmed in our scepticism concerning such agencies as spider-web, cold draughts, sudden changes of weather, etc., etc.

There remains, however, among other things, the possibility of the horse becoming infected by ingestion, as we call it, "by something he picks up," either with his food or water, or a something which he breathes into his lungs.

We all of us know the universal theory of the association of *dew* with the disease, some going so far as to attribute to the dew itself the actual production of the disease. I know that this theory is very widely spread, in fact the so-called dew-theory was till very recently held by a scientific worker in South Africa who, from his lengthy experience and facilities, can bring forward more reasons for the faith that is in him in this respect than probably any other worker with this disease.

The facts supporting this dew theory are briefly as follows:—Practical horsemen have noticed, first, that the more efficient the stabling the greater the protection afforded; secondly, that horses can be safely exposed about the time the grass becomes dry by reason of the evaporation of the dew, and that when the dew is on the grass (*i.e.*, during the evening, night, and early morning), is a time during which the disease is liable to be contracted. During the continuance of wet weather there is little dew and little risk, and several other arguments lend themselves not unnaturally towards the proof of the causation of Horsesickness by dew. Such dew was supposed to be inhaled as the horse grazed among the tufts of grass and herbage, or was swallowed with the food, and it has been frequently suggested in order to account for the presence of the microbe only at certain hours on the ground and herbage, that the dew entangles the microbe which is floating in the air, and this causes its subsistance or precipitation on the herbage, which thus becomes dangerous as it becomes dew-laden.

That such a process as this is impossible, a consideration of the principles of dew formation will show, for, as we know, dew does not fall like rain, but is condensed as it were only upon the actual surface upon which it appears, in a similar manner, in fact, to the moisture which condenses from our warm breath on a cold window pane. The idea, therefore, of falling moisture bringing down the fatal germs and depositing it on the ground is not to be entertained. Besides if it comes from the air in this manner why are not all the horses in the district suddenly affected simultaneously?

I have collected dew in quantities during the dangerous season from localities as dangerous as I could secure, and have not only drenched horses with dew, but have introduced the same directly into their veins—which is the most certain of all methods of producing the disease—but my results have been always, as I expected they would be, entirely negative. I think we must therefore preserve a very open mind towards the dew and remain at least unbiassed against an agent which has been so often accused, until we see further evidence of its innocence.

Is then the evasive and malignant cause to be found in poisonous herbs or roots? I think the owners of large stables in Durban and elsewhere will promptly deny the possibility. Innumerable instances of horses kept strictly on dry food (corn and imported hay) and receiving no herbs green or dried, will be brought forward to prove that infection has nothing to do with poisonous herbs.

Perhaps the drinking water becomes contaminated? Evidence has often pointed to infection occurring when animals were taken to water, but not to any general infection contracted in this way, that is, several horses have drunk at the same spot about the same time, and perhaps only one has taken the disease; and I may say here that I have a number of instances in which horses have become infected where no water has been given except that which has been boiled and allowed to cool with the cover kept carefully on the boiler during the process to prevent possibility of contamination.

It has been thought by some that the germ may be carried about with currents of air and by wind, and that it may be inhaled and cause infection in this manner, and so account for those sweeping attacks which destroy numbers of horses during a bad season.

Here again, however, the objection is insuperable, for all animals in a stable should be equally affected. Such conditions of infection as above are uniform and general in action, while the contagion of Horsesickness is erratic and uncertain to a degree.

We have, I think, excluded food, water, air, the dew, cold and heat, and other climatic conditions, as also other agencies, whether eaten, imbibed, or inhaled.

There remains then the possibility of *inoculation*, or the introduction of the cause of the disease into the system through a puncture of the skin, such as happens in the infection of the ox by the tick in redwater, or infection of man with malaria, and in numerous other instances of disease production.

I fear I may be deemed to have unduly laboured this point, but I wish to bring before you all the arguments in favour of the disease being produced by or through any of the possible modes and agencies which I have laid before you.

It will be known perhaps generally that I hold the opinion that Horsesickness is produced by the bite of a flying insect, and I was led to attempt a proof of this theory by consideration of the various arguments which we have enumerated.

All of these seemed wanting in some one or other vital particular, and the theory of the insect-production of the disease was forced upon me as much by the process of *elimination* of other causes as by the strong parallel or analogy existing between Horsesickness and human malaria.

Since that time a stronger parallel has arisen in the yellow fever of man (which has been such a dread in the West Indies and elsewhere), and this disease has lately been shown to be due entirely to infection by a species of mosquito. In this disease—yellow fever—the microbe of the disease is too small to be seen even by the most powerful microscopes, and this, as you probably know, is true also of the disease Horsesickness.

If we now consider briefly the possibilities of the disease being produced in the horse by the attack of an insect such as a mosquito, I think we must all come to the opinion that such a means of spread of the disease is probable.

The details of an investigation undertaken by myself with the object of proving the agency of insects in the production of the disease are probably known.

A number of horses were taken from Natal into a locality by repute most deadly for the disease. The experimental camp was placed in the Begamusi Valley, in Zululand, and the deadliness of the locality fully bore out the evil reputation earned by this locality for Horsesickness.

The intention was to maintain certain animals in such condition and amid such surroundings that, while they were protected against the possibility of insect attack, they could at the same time breathe whatever miasma the air might contain, and inhale or swallow any infective dew or herbage which grew in the vicinity, and, in fact, be subject to conditions as similar as possible to the horses surrounding in all other ways except in respect to their protection from flies.

This protection was effected in two ways, first by constructing a light frame-work box, the walls of which were formed of sheets of fine gauze netting (No. 32). Through the walls of this box the contained animal was clearly visible, and currents of air could circulate with the greatest freedom. It is not probable, therefore, that germs which are too small to be seen by the most powerful microscope and which are able to squeeze themselves through the pores of the densest porcelain filters would experience much difficulty in gaining access to the test animal under observation in the gauze box.

I am satisfied, therefore, that the possibility of atmospheric infection were adequately provided for.

Two horses were tethered to posts as close to this box as possible, and these animals, which I call the "control cases," or simply "controls," were subjected to exactly reverse conditions, *i.e.*, they were, in the absence of any protection, liable to insect attack, and received no green food or herbage of any kind, while the earth upon which they stood was well burned over and trampled hard so that no blade of grass was within their reach.

If, therefore, *atmospheric influences* were concerned in the production of the disease all these animals should have been equally infected, if *dew laden grass* or other deleterious green food was concerned, then the horse in the box should alone become infected, and, further, in case it should be urged that the *drinking of natural water* caused the disease, the control animals receiving the dry food received also nothing but boiled water, while the horse in the box was watered from the spruit alone.

With the result of this experiment you are probably familiar—the horses outside the box fell victims to the disease and were replaced by other fresh horses, which in their turn succumbed, leaving the horse in the box close at hand absolutely healthy.

The other method of protection was by stabling the horses it was sought to protect in a smoky atmosphere. For this purpose two rough wattle-and-daub stables were erected and horse-dung fires were set smoking about sundown in the doorway. During the day some of the animals thus stabled were permitted to graze naturally, but were brought up as the sun got low. Four or five control horses picketed round about went down one after another with the disease, but no case of sickness occurred amongst the horses in this rough stable in which the air was kept smoky by a smouldering fire.

Thus, by a gradual process of elimination, we showed that most of the factors and influences which we have been taught to regard with suspicion are harmless, and we must admit the possibility of a disease-producing Something unconnected with food, water, wind, and atmospheric influences, dew and even spider web. It must be capable of rapid transmission, must be associated with moisture and absence of sunlight, it must be absent during heavy rains but prevalent afterwards, cold weather checks it, a fine gauze debars it, and when it travels it certainly does not prefer a Smoking Compartment. What will satisfy our equation but a flying insect, active about sundown and sunrise, fond of moisture, avoiding the light and the heavy rain and being most vigorous and aggressive in the close and sultry weather of our summer climate?

I have frequently met with the objection that mosquitoes exist sometimes in great numbers in places and at times when no Horsesickness can be heard of.

This certainly is so, and the objection has been even more frequently brought against the possibility of human malaria being transmitted by this means in other countries. The fact is that a special species of mosquitoes is necessary to the spread of malaria or yellow fever, and the same may be proved to obtain in Horsesickness.

We must remember that as many as 150 different sorts of the genus Culex or the ordinary mosquito so prevalent here have already been described, and of the genus Anopheles, some 50 varieties have already been classified, and probably as many of the the Stegomigia.

When we remember that in the case of malaria only four or five of these 50 varieties of Anopheles are possibly concerned, it will be seen that it is not every mosquito that buzzes and bites at night which can be necessarily considered a culprit in Horsesickness. In fact, on this subject, I have gone but a very little way, having had my hands full with other lines of work and duties. So I can only bid you beware of the mosquito in the abstract, and, as in French Criminal Law, consider them all guilty until their innocence has been clearly proved.

In an earlier report on the disease, you may remember there that I showed that horses confined in a box with certain mosquitoes were not affected by the bites of same until steps were taken to ensure the infection of the mosquito by previous feeding of the insect on Horsesickness blood or a sick horse.

When such infected insect bit the horse within the box, a definite and severe temperature reaction generally followed in some ten to fifteen days afterwards, and, although the horse did not die, the bite of even a few mosquitoes produced a severe and otherwise unaccountable train of symptoms.

The same effects can be produced artificially in the horse by introducing a minute quantity of the virus of the disease into the animal's stomach as a drench or directly into its veins by means of the syringe. That it is necessary to administer such dose of virus with the greatest nicety will be recognised when I tell you that less than 1/10,000th part of one cubic centimetre of an active Horsesickness blood is sufficient to produce the disease when introduced into the veins of a horse.

By way of the stomach the dose may be larger, and I have successfully treated a series of horses with increasing doses of virus by this means until they resisted without reaction a dose of blood, each dose of which would have sufficed to kill several horses with certainty.

We therefore need not be surprised to find that a fatal result does not necessarily attend the biting of an experimental horse by a few infective mosquitoes, particularly as it is difficult to get many insects to bite again when they are already distended with blood. It is further possible, of course, that of the mosquitoes so introduced, the right variety was not present, and that had other and more suitable varieties (unrecognised as yet) been infected and allowed access to these horses, fatal results might have ensued.

While this is conjecture, however, the fact remains that certain well known varieties of mosquito can produce even in small numbers, when infected, an extraordinary disturbance of the system of the horse, and such a fact (in conjunction with the fact that horses protected from flying insects are protected from Horsesickness) lends the strongest presumptive evidence to the correctness of the theory that the disease is produced by the mosquito.

As a practical outcome I can with confidence urge upon you the expediency of adopting some such measures as those described by me above. I believe the smoke system to be more available and practical than trusting to gauze doors and windows, but where valuable horses are concerned I think the extra expense of fitting the stables with mosquito-proof gauze will be well repaid, always remembering that, "as the strength of the chain is to be measured by its weakest link," so the efficiency of the gauze protection will often depend on the care with which such precautions are adopted and maintained. Under the direct supervision of the owner all would go well, but when the lazy kafir or prefunctory coolie are only available then I think the smoke system is the better and safer of the two precautions. The best results have been found to attend the use of smoke in stables where such precautions have been efficiently and thoroughly carried out, and large stables in bad locations have safely gone through severe seasons without a single loss.

I have seen no evil results follow the long confinement in a smoky stable, and, after the fires have been smouldering for some days the walls and fittings, in fact the whole interior, of the stable become impregnated to such an extent as to make it a matter of indifference if the fires should go out by accident during the night.

In conclusion, knowledge of these facts must, I think, be considered an advance on our knowledge as to how the disease is to be prevented where stabling is available. Another problem of equal importance—how to confer resistive power or immunity on unstabled horses—is now occupying my attention, and, though I am not able to bring forward at this time any details of this work, I am able to say without entertaining an unscientifically rosy optimism, I am very hopeful that the means will be attained perhaps earlier than we allow ourselves to hope.

If failure results, as well it may, we shall remember *Ars longa, vita brevis est.* Science will triumph in the end, and her brightest triumphs have often been built up upon the past failures of her votaries.

Natal Orchard Association.

The following is a circular issued by the Natal Orchard Association:—Now the citrus fruit season is so near at hand you will doubtless be looking for lucrative markets, and it is with the object of inducing you to dispose of your crop yourself, rather than sell to coolies or middlemen, that I am bringing to your notice the above Association, which is an organisation (temporary) formed to exploit the sale of citrus fruit on other than the South African markets, viz., in England, and on the Continent, where we are assured from past experience there is an unlimited outlet, provided growers will give that care and attention to cultivation, picking, grading, etc., that is so necessary. The Association has already received splendid support, both from growers and Government; the latter are only too anxious to assist fruit growers, but rightly say that until there is some combination amongst growers it will be impossible to help materially. It is earnestly desired that *you* should help the spirit of combination by being represented in this export with a *portion* of this year's crop. To this end I am prepared to receive offers of fruit, no quantity being too small. Membership to this Association is *free* no *fees* or *subscriptions* being necessary, the fact of a grower being a sender constituting membership. Boxes will be supplied by Government at cost price, through me, and the committee are now arranging with Government for a loan to enable the Association to pay all charges, as boxes, freight, etc. These would, of course, be a first charge on all account sales, which would be rendered about 10 weeks from date of despatch. The sale of the fruit in London (for this year at least) will be through a Government agent; growers will therefore have the guarantee of getting exactly what their fruit realises, less charges. *Each consignment will be sold on its merits.* As I have already stated, the organisation is only a temporary one, but it is hoped that from the results, and experience gained, a more complete and permanent Association will be formed, not only to sell fruit but *all products* of Coast farmers on the South African, and any other markets over-sea that it may be deemed advisable to exploit. In conclusion, allow me to emphasise the importance of combination amongst *European growers* to resist the menace of coolie competition that is gradually but surely undermining the fruit industry, as it is only through co-operation are we ever likely to do any real good, and enable us to call this a "white man's country." Growers who intend sending under this scheme should give the probable quantity of oranges and naartjes they would like to send (in thousands) at once, in order that I may have sufficient time to make the necessary arrangements for boxes, freight, etc. Any enquiries or questions I will be only too pleased to reply to as soon as possible.

Trusting to receive an early and favourable reply, I am, yours faithfully,

ERNEST D. GOBLE, Secretary,
Natal Orchard Association.

18, Castle Buildings, Durban.

N.B.—Freight on box of naartjes containing about 100—1 cubic foot—7½d.

Railage on box of naartjes to Johannesburg—40lbs.—1s. 0¼d.

Railage on box of naartjes to Kimberley—40lbs.—1s. 1d.

The following growers have agreed to become members of the Association and to send 632,000 naartjes:—

Messrs. C. W. Morrison, H. Scott, F. L. Whyte, A. J. Harvey, G. H. North, C. A. Rickagil, J. E. Shire, H. W. James, V. Seymour, H. Skinner, C. W. Rock, A. E. Bulstrode, H. Howard, W. G. Hillary, P. W. Stott, C. Hillary, D. Stainbank, W. W. Cato.

INSTRUCTIONS AND RECOMMENDATIONS TO PACKERS OF FRUIT FOR EXPORT.

That fruit must be cut when pale yellow, and with not less than ⅛ inch of stalk, to be free from scale, clean, and quite sound.

In cutting care must be taken that fruit is not bruised, and when cut to be spread on trays or under shelter (cool and dry), two days prior to packing.

Fruit to be graded into three grades, viz.:—1st grade, 3 inches diameter; 2nd grade, 2½ inches diameter; and 3rd grade, 2 inches diameter. It is advisable that nothing smaller than third grade be sent, otherwise loss may result.

The secretary will notify senders when the Government Expert Packer will be in their neighbourhod to demonstrate how the fruit should be packed.

Boxes will bear the Association mark, but must also be clearly marked with sender's name, or initials, in the space reserved for that purpose, and other marks that may be required.

Senders under this scheme will *ipso facto* be members of this Association, and be subject to the following general rule, viz.:—

"Any sender found guilty of wilful deception in description or quantity may have his fruit rejected at the Point, where it will be liable to be inspected by members appointed by the Asociation for that purpose, or any other provision or rule having for its object the safeguarding of the quality of Natal fruit for the over-sea markets."

Citrus Fruit Export.

If the end towards which things are shaping is reached, Natal will in the near future be realising some of its latent wealth in an export trade in fruit. Our Colony has possibilities in fruit export, but not until recently has it been given the attention and intelligent direction that the fruit trade, more than perhaps any other, requires.

The Minister of Agriculture (Mr. Deane) and the Minister of Railways and Harbours (Mr. Hitchins), since their accession to office, have endeavoured in every way to encourage and promote an export trade in citrus fruits. The Ministers attended a special meeting of fruit-growers convened at Pinetown on Saturday, 19th January, on the occasion of the Horticultural Show, and personally discussed the matter with the growers. Subsequently, on the initiative of the Minister of Agriculture, steps were taken for the formation of a co-operative fruit association. Such an organisation has now been formed embracing the whole Coast belt, with the title of the "Natal Orchard Association." The Association is only a temporary one, but it is hoped that from the results, and experience gained this season, a more complete and permanent Association will be formed later on to sell not only fruit but all products of Coast agriculture on the South African and any other markets over-sea that it may be deemed advisable to exploit. The Association has been formed to exploit the sale of citrus fruit on other than the South African markets, viz., in England, and on the Continent, where it would appear, from past experience, there is an unlimited outlet, provided growers will give that care and attention to cultivation, picking, grading, etc., that is so necessary. The Association has already received splendid support, both from growers and from Government. The latter are only too anxious to assist fruit-growers, but rightly say that until there is combination amongst growers it will be impossible to help materially. Membership to the Association is free, no fees or subscriptions being necessary. The fact of a grower being a sender of fruit constitutes membership. The Secretary of the Association, Mr. Ernest D. Goble, is receiving offers of fruit on behalf of the Association, and already arrangements have been made for the receipt of 632,000 naartjes from growers. The wish of the founders of this Association is to work on a commercial basis, but the Government has been asked to assist by importing the cases on behalf of the Association, and by arranging a loan to enable the Association to pay all charges, as boxes, freight, etc., pending the receipt of sums of money derived from sales in England, the Association itself not being possessed of any capital. This loan is, of course, to be a first charge on all account sales, which will be rendered about ten weeks from date of despatch. For the first year at least, the sale of the fruit in London will be through a Government agent; and this arrangement will ensure growers getting exactly what their fruit realises, less charges. Each consignment will be sold on its merits.

The necessity for combination amongst European growers to resist the menace of coolie competition that is gradually but surely undermining the fruit industry cannot be too strongly emphasised. European producers must co-operate; and it is with the object of forming a nucleus for such co-operation and providing an outlet for our fruit that the Natal Orchard Association has been formed.

The address of the Association is 18, Castle Buildings, Durban; and the advice of this Department is that intending exporters should join this Association and place themselves in communication with the Secretary, in order that the necessary arrangements for boxes, freight, etc., may be made. It may be mentioned, for the benefit of small growers, that no quantity of fruit is too small. The Government will only recognise this Association in connection with the export of fruit, and cannot deal with individuals.

The following suggestions and recommendations for the packing of fruit have been issued by the Secretary of the Association:—

"Fruit must be cut when pale yellow, and with not less than ⅛ inch of stalk, to be free from scale, clean and quite sound.

"In cutting, care must be taken that fruit is not bruised, and when cut to be spread on trays or under shelter (cool and dry) two days prior to packing.

"Fruit to be graded into three grades, viz.:—1st grade, 3 inches diameter, 2nd grade, 2½ inches diameter; and 3rd grade, 2 inches diameter. It is advisable that nothing smaller than third grade be sent, otherwise loss may result.

"The Secretary will notify senders when the Government Expert Packer will be in their neighbourhood to demonstrate how the fruit should be packed.

"Boxes will bear the Association mark, but must also be clearly marked with sender's name, or initials, in the space reserved for that purpose, and other marks that may be required.

"Senders under this scheme will *ipso facto* be members of this Association, and be subject to the following general rule, viz.:—

"'Any sender found guilty of wilful deception in description or quantity may have his fruit rejected at the Point, where it will be liable to be inspected by members appointed by the Association for that purpose, or any other provision or rule having for its object the safeguarding of the quality of Natal fruit for the over-sea markets.'"

On Saturday, 16th February, Mr. E. T. Mullens, Secretary to the Minister of Agriculture, met the Committee of the Natal Orchard Association for the purpose of discussing details in connection with the forthcoming export of citrus fruits to London.

On the question of monetary assistance on the part of the Government, it was agreed that the Association should write to the Minister of Agriculture, asking for a loan of £1,500, this amount to cover the whole cost of the experiment, and to be guaranteed jointly and severally by members of the Association.

The matter of the appointment of an expert agent to look into the marketing of the fruit in London received some attention. Mr. Mullens informed the meeting that he had been requested by Mr. Hitchins to state that Mr. Richards, the Prime Minister's secretary at the forthcoming Conference of Colonial Premiers, would, with the assistance of Mr. J. S. Morrison, attend to this matter, and that he had further been asked by Mr. Hitchins to say that exporters might rest assured that a suitable man in London would be appointed to attend to their interests.

In reply, it was pointed out by the meeting that the gentlemen referred to were not fruit experts, and that expert handling of the consignment in London was necessary to the success of the experiment. After further discussion, the meeting asked Mr. Mullens if the Government would pay the passage of Mr. F. L. White, of Durban, to accompany the first consignment to London. Mr. White would prepare a daily report on the condition of the fruit during the voyage, which would afford a valuable guide as to further cargoes, and he would remain in London three weeks and receive two or three shipments. Mr. Mullens noted the suggestion. He further agreed to cable to Mr. Sim, who is at present in London in connection with the South African Exhibition, for suggestions as to fruit marketing in England.

The Department has received enquiries from Port Shepstone and other parts of the Colony regarding the forwarding of citrus fruits to the London markets. It strongly recommends that all intending exporters should place themselves in communication with the Natal Orchard Association. If this season's shipment of naartjes proves to be the success which the promoters are hoping it to be, the Department recommends that any future consignments of citrus fruits should be forwarded in bulk to a central organisation, that each supplier be credited with a sum representing the value of the fruit in bulk, and that the grading and packing be done by the central organisation, any extra profits being divided amongst the suppliers in proportion to the quantities forwarded.

The Government has succeeded in obtaining a reduction of freight on fruit in cold storage from Durban to London. This will place this Colony on a parity with the Cape Colony.

The so-called sacred cattle of India imported into Texas by Mr. Borden, of that State, were shipped from Karachi. Most of the animals were bulls. Should the expectation of the imperviousness of their hides to ticks and also their breeding qualities be demonstrated, it is likely that other shipments of Indian live stock will follow.

Experiment Farms.

CEDARA.

TO DIRECTOR EXPERIMENT STATIONS.—

In submitting my report for the past month (February), the outstanding feature for that period has been the heavy rainfall; this is, however, invariably the case, as the heaviest monthly rainfalls are usually recorded in February. 7·94 inches were registered, and as it only fell on 12 different dates it will be understood that it rained heavily at times. From the 1st July we have now had over 30 inches of rain, which is above previous records for a number of years.

The Mangels, as mentioned in my last report, having proved a failure, the ground has been planted with swedes and turnips. The seed sown was a mixture of several varieties; they germinated fairly uniformly, but, owing to the heavy rainfall, and Reit Spruit overflowing its banks and flooding the ground, the crop has received rough treatment; however, with surface cultivation, thinning, and favourable weather, they should now prove a fair crop. A further portion of four acres in front of the Assistants' Quarters has been planted, and the ground formerly used for the Maize Manure Experiments, will be planted with the same crop.

A Manure Section of Flax, comprising four plots, with an approximate area of four acres, which was planted early in the month, is at date of writing looking very healthy and promising, although it suffered from the effects of the heavy rain and wash.

Two acres of Chicory have been planted, but has not yet appeared over-ground. Kale planted at the same time is just showing up.

We have been very unfortunate with earlier Cabbages, a large percentage of which were destroyed by cut-worm, in spit of repeated treatments. Later plantings are now well established.

Indian Oats have been planted and are looking very well indeed; the experiment which is being tried is to determine the quantity of nitrogen required; also, the possibility of harvesting grain in early winter, and the effect on character.

The work of organising an experiment for the improvement of the veld has been put in hand in one of the pasture paddocks. Twelve plots of an acre each have been treated with kraal, chemical manures, and lime. On the application of these manures one-half of each plot has been harrowed with light zig-zag harrows and the other half with disc harrows to break the surface and cover the manures. Pressure of work, I am sorry to say, will prevent an experiment being carried out in ploughing and preparing land for English grasses, clovers and other legumes, instructions for which have now been on hand for some time.

Attention has been given to the de-tasseling of maize crops which had been planted with different varieties in alternative rows for the purpose of cross-breeding for seed selection. The field report necessary to be made in this connection I have no doubt would be of public interest, and is as follows:—

MAIZE FIELD REPORT.

Date . . . .

Variety . . . .
Time of planting . . . .
Manures . . . .
Soil . . . .
Reference No. . . . .

(*a*) *Plant in Field*:—

1. Time of: plant silking . . . . : green ear fit for cooking . . . . : partly dented or glazed . . . . : nearly ripe . . . . : ripe . . . . :
2. Height of plant: average of 10 plants . . . . . .feet . . . . . .inches.
3. Proportion of ears: number of ears on 100 stalks . . . .
4. Barren stalks: number in 100 stalks . . . .
5. Position of ear: pointing upward: horizontal: pointing downward . . . .
6. Husks: adherent: medium, non-adherent: . . . .
7. Husks: abundant: medium, scanty: . . . .
8. Length of shank: distance from culm to base of ear: average of 10 plants . . . .
9. Circumference of stem: at middle of internode between second and third from the ground: . . . .
10. Circumference of stem: at middle of internode below main ear . . . .
11. Number of leaves: average of 10 plants: . . . .
12. Average width of leaf blades: average of 5 plants: . . . .
13. Average length of leaf blades: average of 5 plants: . . . .
14. Length of tassel: average of 10 plants: . . . .
15. Grain set on tassel: number of cases in 100 plants: . . . .
16. Lodging of plant: due to wind or rain: number of plants in 100 . . . .
17. Root development: abundant: medium: scanty: . . . .
18. Colour of leaves: dark green: light green: greenish yellow: . . . .
19. Rust: on leaves . . . . . . per cent.: on culm . . . . . . per cent.
20. Smut: on leaves and stem . . . . . . per cent.: on ear . . . . per cent.
21. Borer in culm . . . . per cent.: in ear . . . . per cent.

Notes:— . . . .
. . . .

(*b*) *Harvest Report*:—

1. Shape of ears: cylindrical: semi-tapering: tapering . . . .
2. Shape of butt: cylindrical: swollen: tapering . . . .

3. Length of ear: average of 10 .. ..
4. Diameter of ear: 1-3rd of length from butt: average of 10 .. ..
5. Diameter of cob: 1-3rd of length from butt: average of 10 .. ..
6. Number of rows of kernels .. ..
7. Straightness of rows: straight: twisted: irregular: .. ..
8. Spacing between rows: close: medium: open: .. ..
9. Tip: well-filled: partially-filled: naked: .. ..
10. Butt: well-filled to shank: partially-filled: naked: .. ..
11. Shape of kernels from middle of ear: square: wedge-shaped: rounded: .. ..
12. Length of kernel: longer than broad: as long as broad: shorter than broad: .. ..
13. Length of kernel: .. ..
14. Width of kernel: .. ..
15. Thickness of kernel: .. ..
16. Size of germ: small: medium: large: .. ..
17. Character of endosperm: distribution of horny and starcy portions: corneous layer only at sides of kernel. corneous layer at sides and outer angles: corneous layer completely surrounding starchy portion: .. ..
18. Colour of kernels: pearly white: creamy white: yellowish white: light yellow: yellow: reddish yellow: .. ..
19. Colour of cob: white: light red: dark red: .. ..
20. Germination: place 100 kernels between well-moistened flannel and keep at a temperature of 80 degrees F.: first day .. .. .. per cent.: second .. .. .. per cent.: third .. .. .. per cent.: fourth .. .. .. per cent.: fifth .. .. .. per cent.

Ground has been ploughed for a variety of fallow crops which are to be turned under green during the spring. These are Barley, Soy Beans, Lupines, and Rye.

On the Catch Crop Section, Winter Tares, Rye, Winter Oats, Horse Beans and Rape are now planted.

The amount of labour entailed in clearing all ground for the various crops has been exceptionally heavy this season, and, although a good deal in that way has yet to be done, the growth of weeds will not be to the same extent as during the past two or three months.

With a view to further economy, a transfer of Indians has been effected with the N.G.R., their places being taken by a gang of rebels, who, so far, have proved quite satisfactory. They are put to work in gangs under police supervision.

A few coolies are still kept for work that it would be inadvisable to employ convict labour on.

The officer reported sick in my last report, I am pleased to say, has now recovered and assumed duty.

ALEXANDER REID,
Farm Manager.

THE COLLEGE.

To Director Experiment Stations.—

I am glad to be able to report a considerable increase in numbers during the last month. We now have 21 students on the books, and, as five more are entered to come by the end of this month (March), we shall very soon have reached the limit of our accommodation. I do not well see how the present building can be made to hold more than 28, and the question of increased accommodation must very shortly be faced. I would suggest that a bricklayer be engaged, who, with the Farm carpenter and students, might build more sleeping accommodation on a different plan to the present building. By this arrangement a double advantage would be gained. We should obtain the extra accommodation that we are likely shortly to require, and the students would gain most useful experience in learning how to erect good, permanent brick buildings. At present no instruction is given in building except by the carpenter in wood and iron work. It we could obtain the services of a competent bricklayer, we should then be able to give instruction in this method of building, which would, I hope, give a healthy stimulus to this more satisfactory style, and do something towards reducing the enormous amount of rough and unsightly wood and iron sheds that are to be seen on so many farms in the Colony to-day.

The work of the School has progressed steadily during the past month, both in the field and lecture room.

C. W. HANNAH,
Headmaster.

LABORATORY REPORT.

FIBRE NOTES.

To Director Experiment Stations.—

A sample of green leaf and also fibre obtained from the plant Sansevieria guineesis (?) and recently forwarded by Mr. Adams, of Adamshurst, was submitted to analysis for the purpose of determining its chemical value, and it may be of interest, in view of the attention now being paid to the production of fibre, to compare it in some measure with that of the Furcraea gigantea or aloe, so much in favour as a fibre producer.

The Sansevieria guineesis or Bowstring Hemp is familiar to many, it has long, erect lanceolate leaves, 3 to 4 feet long and 2 to 3 inches broad in the middle, narrowing gradually to an acute apex; the surface of the leaf is mottled with broad irregular bands of white.

Samples of Furcraea gigantea green leaves grown in different districts of Natal were examined some time ago, and these are given under their respective headings alongside of the Sansevieria referred to.

	Sansevieria.	Fureraea gigantea.	
		Port Shepstone.	Duff's Road.
Moisture, per cent.	88·63	85·18	86·95
Fibre, per cent.	4·12	5·06	4·35
Ash, per cent.	1·63	1·79	1·60
Length of Leaves	2 to 4 ft.	4 to 5 ft.	6 to 10 ft.
Weight of Leaves, average	6 oz.	—	5 lbs. 5 ozs.

The leaves of the Sansevieria submitted were both shorter and narrower than those of the Furcraea, and the percentage yield of fibre somewhat less.

It will be observed that there are some differences in the proportionate composition of the individual samples of the Furcraea itself as grown in the two districts. That grown near Duff's Road, on the North Coast, is much longer than that obtained further south; the leaves of the former were longer and slightly broader; they contained rather more moisture and less fibre, but produced a larger yield of fibre per plant.

A comparison was instituted between the soils of each district in order to determine the difference in composition, if any, which might account for the variations in the leaf production; the difference in climatic conditions was also regarded as a probable source of influence on the plant's growth, the more tropical nature of the North—greater heat and humidity—being conducive to a ranker growth.

Hereunder is given a statement of the average percentage composition of five Port Shepstone soils and of a Duff's Road soil, taken from the land in which the plants were grown:—

	I.—Port Shepstone.	II.—Duff's Road.
Moisture	1·41	6·47
Loss on Ignition	3·98	8·02
Insoluble Matter	88·29	73·22
Silica	0·23	0·03
Phosphoric Acid	0·03	0·22
Potash	0·09	0·07
Lime	0·06	0·32
Magnesia	0·05	0·31
Sulphur Trioxide	0·10	—
Iron and Alumina	5·39	11·39
Chlorine	0·005	—
Nitrogen	0·06	0·18
Humus	1·98	3·63
Gravel and Fine Sand	74·25	—
Fine Material, Clay and Silt ..	25·75	—
Soluble in Dilute Citric Acid.		
Phosphoric Acid	0·003	0·008
Potash	0·008	0·019

A comparison of these two soils results very much in favour of No. II., in which Nitrogen, Phosphoric Acid and Lime are much more in evidence, the Citric Soluble Potash being also in better proportion. The lime itself has probably a good deal to do with the better yield. The difference displayed in the growing and producing qualities of the plant under the two local conditions may bear the interpretation or indicate that, although the plants do well on poorer soils and slightly cooler and drier districts, they will respond to more favourable conditions of soil and climate.

The sample of extracted fibre submitted from the Sansevieria was white with a slightly yellow tinge, lustrous and of considerable strength; its chemical examination, which is of importance in determining the value for commercial purposes, is given below in juxtaposition with the average of several samples of the Fureraea gigantia reported on by the Imperial Institute and recorded in their technical reports:—

	Sansevieria guineesis	Fureraea gigantea
Moisture	12·5	9—11
Ash	0·5	2—3
Loss on Hydrolysis (*a*)	8·9	
Loss on Hydrolysis (*b*)	11·4	
Loss on Mercerisation	6·0	11—16
Gain on Nitration	29·6	34—40
Cellulose	77·9	72—78
Length of Ultimate Fibre	1·5—5 m.m.	1—5 m.m.
Length of Staple	3 ft.	4 ft.

The percentage of true cellulose, the length and strength of the fibre, and length of the ultimate fibre, are of first importance in valuation. The amount of moisture is to some extent an index of the susceptibility of the fibre to attack by hydrolytic agents. Fibre of the better class show relatively low moisture.

The action of dilute Alkali is given under loss on Hydrolysis: (*a*) When subjected to its action for five minutes; (*b*) when in contact for an hour, the results indicate ability to withstand prolonged exposure to moisture and Alkali liquors such as are used in washing; a low percentage of loss is indicative of a better fibre.

Under loss on mercerising the power of the fibre to withstand the action of strong Alkali is given.

The fibre of the Sansivieria is said to be a very valuable one, and is used for many purposes, including the manufacture of cordage and twines, ropes and textile fabrics.

ALEX. PARDY, F.C.S., etc.,
Analyst.

WEENEN.

To Director Experiment Stations.—

During the month of January the principal work in hand has been the ploughing up of all available land for winter planting. The most of this land has to be levelled and graded before seeding operations can be properly carried out, and, unfortunately, this work, and likewise most outdoor work, has been delayed by the incessant rain that is being experienced lately. However, as the proper time for planting winter cereals for this locality is from mid-March to end of April there is as yet plenty of time for carrying this work out properly, and to put seed into ground not properly prepared is, as you know, more or less waste of time and materials.

As you requested, the first thing being done is the planting of the section for drainage tests. The seed has not yet been planted, but will be done as soon as possible. I have noticed that the tile drains on this section have been running freely since the rainy weather commenced, and the results of the under drainage is apparent on the surface, which is comparatively dry and mellow.

A large drain is being dug along the natural depression on lower end of station, the lands adjoining which have become rather swampy since the advent of the rainy weather. This drain will shortly be completed.

I am constructing a grading machine, which will be required for grading operations as soon as weather permits.

The varieties of tobacco which have been planted have unfortunately been badly knocked about by hailstorms, an unusual number of these storms being experienced this season. Notwithstanding this the tobacco is making fair headway. The building of the flue curing barn is in hand and is being proceeded with as fast as circumstances permit.

On the Cultivation and Manure Test Plots of Lucerne good results are being obtained from cultivation between the rows with a 14-tooth cultivator taking two rows at a time. Though this cultivator has only been in force for a few months, the result, as compared with no cultivation plots, is very marked indeed. It is to be expected that as time goes on the advantage will be still more apparent than at present. It is yet too early to observe the result of manures on these plots, as it has only recently been applied.

Different varieties of Celery transplants will shortly be available for planting out in field, and seedlings of Asparagus and Rhubarb are being raised.

F. McPHERSON,
Curator.

WEENEN.

To Director Experiment Stations.—

I have to report that no planting operations have been practicable since your last visit owing to incessant rain. I regret that this is so, as I promised to have the drainage test field planted early. However, as far as proper time for planting is concerned, nothing has been lost by not having yet planted, as the proper month and time for planting these crops is next month, April. I am now doing the best thing possible under the circumstances, viz., cross ploughing and preparing all available land for planting next month. This cross ploughing is quite necessary, in fact, absolutely necessary, as quite a crop of weeds have sprung up, as is always the case in January and February, and to try and plant and grade land full of half rotten weeds and grass is waste of time. Good progress is being made with tobacco barn, the walls now being three-parts finished. Mr. Walters has very kindly offered to help me to put the roof on, and this will be done as soon as possible. Unfortunately, I find that a part of the materials have been left at Estcourt or somewhere, which may delay us a day or two.

The tobacco in field is apparently very stunted, but has made fair progress, considering that it was twice cut up with hail in the young stage. I am also of the opinion that the planting was done too late in the season. This, of course, was unavoidable under the circumstances.

F. McPHERSON,
Curator.

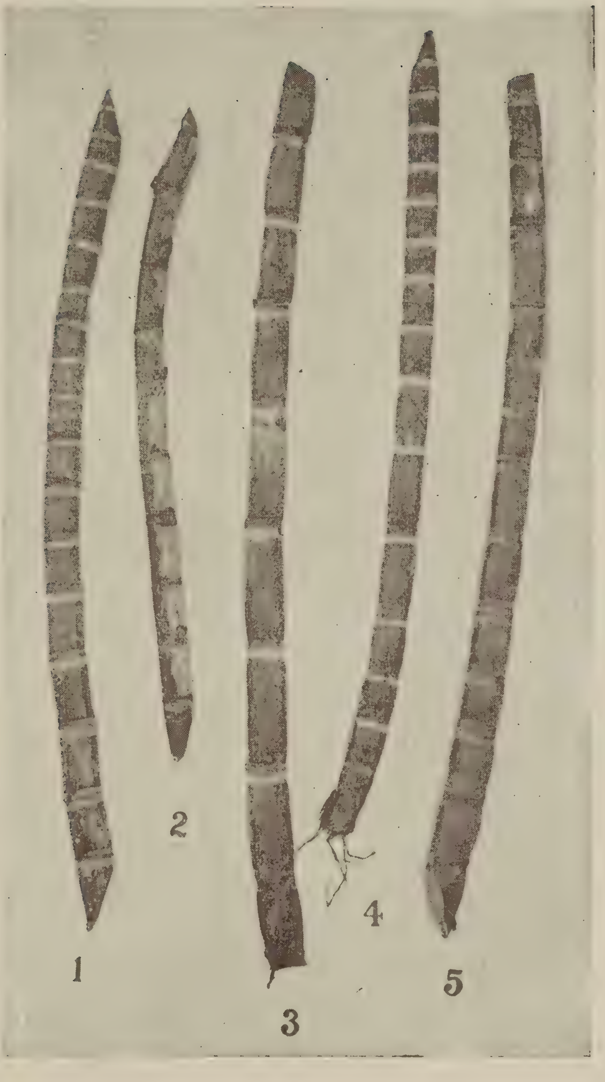
WINKEL SPRUIT.

To Director Experiment Stations.—

During the month of February seeds were sown as follows:—Asparagus (which has failed to germinate), Maize on the two sections formerly occupied by Russel's Big Boll Cotton, Maize on Kraal Manure Section, Peanuts, Tea, and Cowpeas. Arrowroot was also planted, but this does not appear to be doing any good, due to being planted too late in the season.

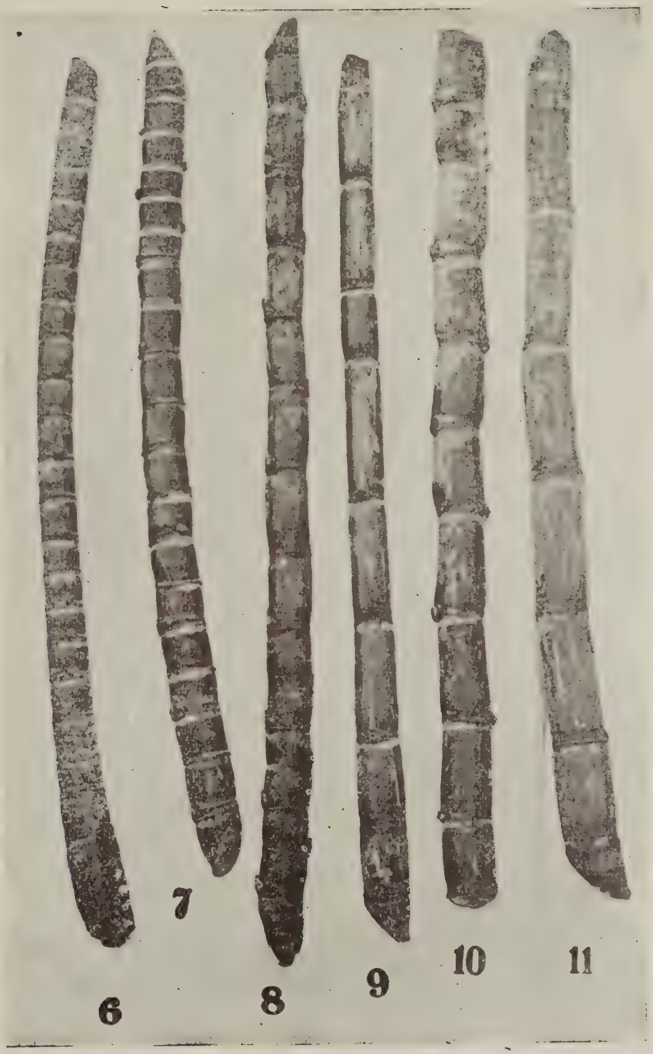
Mostly all other crops have made splendid growth during the month, owing, no doubt, to the high temperatures and heavy rainfall. The maximum shade temperature averaged for the month 82 1-7th degs., constituting a record for this Farm.

The rainfall has been exceptionally heavy, over 9½ inches being registered. Heavy downpours occurred on the following dates: 2nd,



NEW TYPES OF SUGAR CANE UNDER CULTIVATION AT WINKEL SPRUIT EXPERIMENTAL FARM.

1. Antigua B. No. 15.
2. Antigua B. No 95.
3. Antigua B. No. 109.
4. Queensland No. 3.
5. Queensland No. 2.



NEW TYPES OF SUGAR CANE UNDER CULTIVATION AT WINKEL SPRUIT EXPERIMENTAL FARM.

6. Honolulu Rose Bamboo.
7. Honolulu Laihainer.
8. Demerara D. No. 95.
9. Demerara D. No. 109.
10. Demerara D. No. 145.
11. Demerara D. No. 626.

3rd, 4th, and 16th, and registered 2·15 inches, 1·63 inch, 1·95 inch, and 1·33 inch respectively. A great deal of damage was done by the storms on the 2nd and 3rd insts., causing numberless wash-outs all over the Farm; the sections to suffer most were the Chicory, Maize (Kraal Manure Section), Potatoes, and Tea.

Although we were sadly in need of rain at the time, we were unfortunate in having such heavy storms, as, out of 2,200 young tea plants just planted, about 75 per cent. of them were destroyed. The Kraal Manure Section of Maize was completely washed out, and, as stated above, was replanted. With the exception of replanting Chicory, most of the other damages have been repaired.

What was almost an impassable bog—where the road crosses the gully near the Orchardist's residence—has been transformed into a passable road, we having erected a culvert and built a corduroy roadway. We were greatly assisted in this by the Orchardist, who had a deep drain dug down the centre of the gully to carry off the silt washed down by storms.

The clearing of undergrowth from bush land for a coffee plantation has been finshed and 352 coffee stumps planted.

Weeds are growing profusely all over the Farm, and it is a difficult matter to cope with them. A horse has been purchased for the light cultivators, and with this in constant use it should materially help in keeping the weeds under in the future.

As reported to you, three of the young pigs died during the month from sickness. Blood slides have been taken from several since and forwarded to D.V.S. Amos for examination, who reported no disease.

Results tabulated from three years' experiments in cultivation and manuring of Pineapples prove that they deteriorate to a great extent each year. A section containing 22 plots was planted in January, 1904. Twelve of these plots were manured with different fertilisers, and ten (including half borders) were not manured. The first crop harvested resulted in an average yield of 2lbs. 2½ozs. per Pineapple, the second crop 1lb. 13½ozs., and the third crop an average yield of 1lb. 8ozs. per Pineapple. This deterioration was not restricted to any special plots, such as manure or no manure, but was a general one of the whole crop.

The no manure plots have given a slightly better average weight of Pine than the manure plots, conclusively proving that indiscriminate manuring would act more as a deterrent than an augmenter to this particular kind of fruit.

The following table, giving the actual results recorded—with manures used—may prove of some value to Pineapple-growers. The quantities of manure given are per acre, and the same kinds of manure used on each plot each succeeding year.

PINEAPPLE RESULTS, 1905, 1906, 1907.

Plot.	1904. Manures.		1905. Average Weight per Pine.		1905. Manures.		1906. Average Weight per Pine.		1906. Manures.	1907. Average Weight of Pines.	
		lbs.	lbs.	ozs.		lbs.	lbs.	ozs.		lbs.	ozs.
B½	No Manure	...	2	2-5/8	No Manure	...	1	12-2/3	No Manure ...	1	7-3/8
176	Sulphate of Ammonia...	50	2	1-4/7	Do. 1904 ...	150	1	14-10/13	Do 1905 ...	1	9-4/17
	Superphosphate ...	50			Do. do. ...	150					
	Chloride of Potash ...	25			Do. do. ...	100					
177	No Manure	...	2	5-1/4	No Manure	...	2	0-3/5	No Manure ...	1	10-6/19
178	Sulphate of Ammonia...	100	2	6-7/13	Do. 1904 ...	300	2	1-3/20	Do. 1905 ...	1	14-1/2
	Superphosphate ...	100			Do do. ...	300					
	Chloride of Potash ...	50			Do do. ...	150					
179	Sulphate of Ammonia...	150	2	5-7/9	Do. 1904 ...	450	2	1-19/23	Do. 1905 ...	1	12-10/17
	Superphosphate ...	150			Do. do. ...	450					
	Chloride of Potash ...	75			Do do. ...	200					
180	No Manure	...	2	3-1/4	No Manure	...	1	15-1/10	No Manure ...	1	10
181	Superphosphate ...	100	2	2 3/7	Do. 1904 ...	300	1	15-3/5	Do. 1905 ...	1	6-10/19
	Chloride of Potash ...	50			Do. do; ...	150					
182	Sulphate of Ammonia...	100	2	10	Do. 1904 ...	300	2	3-1/4	Do 1905 ...	1	14-1/6
	Chloride of Potash ...	50			Do. do ...	150					
183	No Manure	...	2	4-2/11	No Manure	...	2	0	No Manure ...	1	5-5/8
184	Sulphate of Ammonia...	100	2	4	Do. 1904 ...	300	1	13-1/3	Do. 1905 ...	1	8-2/11
	Superphosphate ...	100			Do. do. ...	300					
B½	No Manure	...	2	0-3/4	No Manure	...	2	0-8/9	No Manure ...	1	12-1/4
B½	No Manure	...	2	3-3/4	No Manure	...	1	12-5/9	No Manure ...	1	6-9/11
185	Superphosphate ...	100	2	1-2/11	Do. 1904 ...	300	1	12-1/12	Do. 1905 ...	1	8-2/15
186	No Manure	...	2	3-1/4	No Manure	...	1	13-8/9	No Manure ...	1	9-5/14
187	Basic Slag	100	2	2-1/11	Do. 1904 ...	300	1	13-1/7	Do 1905 ...	1	10-1/12
188	Bone Dust	100	2	1-8/11	Do. 1904 ...	300	1	12-9/11	Do. 1905 ...	1	7-2/3
189	No Manure	...	2	1-1/6	No Manure	...	1	12-3/5	No Manure ...	1	7-3/10
190	Nitrate of Soda ...	144	1	15-1/6	Do. 1904 ...	400	1	13-5/17	Do. 1905 ..	1	8-25/28
	Superphosphate ...	100			Do. do. ...	300					
	Chloride of Potash ...	50			Do. do. ...	150					
191	Sulphate of Ammonia...	100	2	0-5/6	Do. 1904 ...	300	1	11-1/3	Do. 1905 ...	1	10-1/18
	Superphosphate ...	100			Do. do. ...	300					
	Chloride of Potash ...	50			Do. do. ...	150					
	Lime ...	10 cwts.			Do. do ...	1,000					
192	No Manure	...	2	0-1/4	No Manure	..	1	12-3/4	No Manure ...	1	10-1/3
193	Superphosphate ...	100	1	10-1/2	Do. 1904 ..	300	1	9-7/13	Do, 1905 ..	1	9-1/4
	Lime ...	10 cwts.			Do. do. ...	1,000					
B½	No Manure	...	2	0-2/5	No Manure	...	1	10-2/15	No Manure ...	1	10

From this table it will be found that the average weight per Pineapple for each year from No Manure and Manure Plots work out thus:—

1905.				1906.				1907.			
No Manure.		Manures.		No Manure.		Manures.		No Manure.		Manures.	
lbs.	ozs.	lbs.	ozs.	lbs.	ozs.	lbs.	ozs.	lbs.	ozs.	lbs.	ozs.
2	2-2/3	2	2-1/3	1	14-1/7	1	13	1	9	1	7-1/7

Although these figures prove a better result all round from No Manures than from Manures, it does not follow that manures cannot be profitably used. Take Plot 182 for instance, which was manured with a medium dressing of Sulphate of Ammonia and Chloride of Potash, and it will be found that a pine has been produced giving an average weight for the three years of about 2lbs. 4ozs. This, again, has been closely followed by Plot 178, manured with a medium dressing of complete manures.

The most uniform Pine produced was from Plot 193, and, although these were on the small side, and proves that the use of lime has a deleterious effect for the first year or two, it is questionable—if the experiments are carried on for another three years—whether the beneficial effects of the lime will not be more noticeable.

As advised by you, half of each of these sections will be taken up and planted with young suckers. This work will be taken in hand at an early date.

W. JOHANSEN, Manager.

The Campbell System of Culture.

In order to obtain more definite information on the subject of the Campbell system, the Agricultural Department of South Australia wrote to the Directors of the different Agricultural Experiment Stations in the so-called semi-arid regions of America. The following interesting report has been supplied by the Farm Superintendent of the Kansas Experiment Station. Kansas has a population of over one and a half millions, and, in addition to other staples, produces from 50 to 90 million bushels of wheat and up to 200,000,000 bushels of maize, climatic conditions permitting a wide diversity of cropping. The Agricultural Department of South Australia are purchasing a sub-packer for the purpose of experiments in their "semi-arid" districts. The following is the report referred to:—

The Campbell system of culture is theoretically correct, and, in part or in whole, it can be put into practice on almost every farm in Western Kansas profitably. The system is intended to favour the conservation of soil-moisture, and is thus especially adapted to regions where a limited supply of irregular rainfall makes the most careful methods of soil-culture necessary, in order to conserve the water in the soil and get the most use from it in the production of crops.

So far as cultivation is concerned, there are three principles in the conservation of soil-moisture. First, the soil must be loosened to a considerable depth, in order to prepare a reservoir to receive the rain and carry the water downward into the soil. This is accomplished in the Campbell system by the deep-ploughing or by discing of the unploughed uplands. Second, the water, which is carried downward into the subsoil, must be brought again into the surface soil, where the seed is germinating and the young roots are growing; and to accomplish this a good connection must be made between the furrow slice and the subsoil below, and this is the purpose in the use of the subsurface-packer. Third, finally, in order that the water, which is drawn up toward the surface, may not reach the air and be wasted by evaporation, the upper two to four inches of the soil must be kept mellow, in the form of a soil mulch, which is accomplished by frequent cultivation, and is applicable not only to corn and other ordinary crops, but also to wheat and other small-grain crops.

Discing the land before ploughing puts the soil of the furrow slice in better condition to re-unite with the subsoil. The smooth, hard furrow bottom, left by the ordinary plough, however, is unfavourable to the proper union of the furrow slice with the subsoil. To make the system more perfect, I would add one more operation, namely, the bottom of the furrow slice should be scraped or loosened, so that the union of the soil with the subsoil may more quickly take place again after ploughing. The principles stated above have been known and practised more or less for a long time; but it remained for Mr. H. W. Campbell, of Lincoln, Neb., to arrange these principles into a system of culture, and put the system into practice throughout the Western States. Mr. Campbell has done more to call the attention of the farmers of the West to the necessity and advantage of good cultivation of the soil that any other investigator. The Campbell system of culture is, in fact, simply good tillage, and good cultivation of the soil at the right time, in the right way, and in a systematic manner. Good farming pays in the West as well as in the East. I fully believe in the practicability of thorough tillage and good cultivation on every farm; and the increase in crops will more than pay for the extra work, and in a series of years will leave our farms in a better state of fertility and more capable of producing crops than will result from the careless and shiftless methods of farming which are yet too commonly carried on by many farmers throughout the West.

It is not necessary to have extra machinery in order to successfully practise the Campbell system of culture. The only implement needed which farmers do not generally have in use on their farms is the subsurface-packer. The use of the packer is most essential *on late spring ploughing, when the purpose is to plant at once after ploughing.* It is not so necessary to use the subsurface-packer on fall ploughing which is not intended to be planted until the following spring; but for sowing fall wheat, *if the ploughing precedes the sowing by a very short interval, the subsurface-packer may be used advantageously.* Where the land is allowed to lie for a considerable period after ploughing before the crop is planted, the settling of the soil, together with the cementing due to the rain, usually causes the soil to repack and firm-up to a sufficient extent to make a good seed-bed.

The subsurface-packer is a hard-running machine, and it costs more to use it than it does to use the common harrow or even the disc harrow. Thus at the Kansas Experiment Station we have adopted the practice of early ploughing whenever it can be done, in preference to subsurface-packing, using the harrow immediately after ploughing. However, the principle involved in the use of the subsurface-packer is correct, and the lighter the soil and the greater its tendency to remain loose and mellow, the more necessary it is to make use of the subsurface-packer or some similar implement, in order to prepare the seed-bed in a proper manner. Also, in ploughing under trash or manure, subsurface-packing, by pulverizing the bottom of the furrow slice, sifts the soil through the coarse trash and causes a better union with the soil below, so that the capillary water may be drawn up into the surface soil; whereas if a heavy coat of stubble or manure ploughed under in this way is left without packing or pulverizing, the furrow slice is apt to dry out, and the crop that is growing on the land may be injured by a short interval of hot weather.

By setting the discs rather straight and weighing the harrow, a disc-harrow may be used as a substitute for a subsurface-packer. In mellow, trashy ground its work is somewhat similar, resulting in pulverising and firming the soil at the bottom of the furrow slice. Very often, however, good ploughing with the proper and sufficient use of the common harrow, may largely accomplish the results required in carrying out the Campbell system of culture.

Some types of soil can be ploughed deeper than others. As a rule, I believe in deep-ploughing—at least every few years. The deeper loosening of the soil not only makes a larger reservoir to catch the rain, but it gives more room in which the soil bacteria may develop and prepare the plant food. It is known now that certain bacteria in the soil have much to do with the preparation of the food of plants, and experiments have shown that these bacteria are found largely in the surface, six to nine inches of the soil, or in that part of the soil which is turned by the plough and stirred with the cultivator. Thus deep-ploughing favours the development of these bacteria and the preparation of more available plant food than is the result from shallow ploughing. It may not be best to plough deep every year; sometimes shallow ploughing will doubtless give better results, and occasionally it is best not to plough at all. The depth and frequency of ploughing will vary according to the nature of the soil, a light or sandy soil requiring less depth of ploughing and less frequent ploughing than a heavy, compact, clayey, or gumbo soil. This fact should be borne in mind, that when the land is ploughed deep it is necessary to re-establish the capillary connection of the soil with the subsoil and prepare a good seed-bed condition by the methods described above, in order that unfavourable results may not come from the deep-ploughing.

The principle of loosening the surface of the soil and keeping a mulch of mellow soil in order to break the capillary movement of water and prevent its evaporation, is well recognised by farmers generally, and is also practised to a greater or less extent in the cultivation of all kinds of crops. In the Campbell system of culture the purpose is to keep a mellow soil mulch on the surface of the land all the time, not only during the growing season of the crops, but also in the interval between harvest and seeding time. Thus, after the crop is planted the land is kept cultivated with the harrow or weeder, in order to break the surface crust and conserve the soil moisture; and, following out the same principle, the harrowing or work with the weeder is continued after the grain or corn is up, and during the growing period frequent cultivation is practised. After the crop is harvested the cultivation is not discontinued, but the surface of the ground is loosened as soon as possible after the crop is removed, by the use of the disc-harrow, and thus the soil is kept continually in a condition, not only to prevent the loss of water already stored in the surface soil, but this same condition and the mellow surface favour the absorption of rain and largely prevent the loss of water by surface drainage.

The weed-harrow, or weeder, is probably a better implement for harrowing wheat or other small grain than the common straight-tooth or even the slanting-tooth harrow. The weeder is somewhat objectionable on account of the wheels. When the ground is reasonably firm the common harrow may be used without injuring the wheat.

I question whether it is necessary to continue the harrowing after the wheat covers the ground well, unless very heavy rains firm and puddle the soil, destroying the mulch of mellow earth. Uusually, this will not occur. I have harrowed wheat when it stood five or six inches high, and had stooled so as to about cover the ground, and the mulch thus produced was still in evidence at harvest-time. In this experiment the ground was harrowed twice on the same day. The yield of wheat from the harrowed field was, on the average, three bushels per acre above that from the field adjacent not harrowed. This experiment, with others, was carried on at the North Dakota Experiment Station with spring wheat, and it was observed that wheat harrowed before it had stooled much was injured in stand, and gave a lower yield of grain than wheat not harrowed. Wheat or other small grain may usually be harrowed without injury before it comes up, but after the grain is up it should not be harrowed until it has established a good root and made considerable top growth. It appears that even with winter wheat there may be some danger of injuring the wheat if harrowed too early in the spring, and I would not, as a rule, advise to harrow in the fall. Experiments in the harrowing of wheat and in the practice of the Campbell system of culture are being undertaken at the Fort Hays Branch Experiment Station, in Ellis County, Kansas, and also at the Experiment Station at Manhattan, Kansas.

A. M. TEN EYCK,

Professor of Agronomy and Superintendent of Farm,
Kansas Experiment Station, Manhattan, Kan.

It is well known in the West Indies that the seed from a good American variety of tomato, locally grown, does not produce such large fruits as seed direct from England or the United States. The tomato, however, is very easily grown from cuttings, and advantage can be taken of this fact to prevent deterioration of the fruit. This method has been practised for several years at St. Lucia. A planter in Christ Church, Barbados, has also grown tomatoes from cuttings, without using any seed, for ten years. The cuttings when rooted are planted out in the cane field. The field being a dry one the plants are not staked, but are allowed to bend to the ground under the weight of the fruit. In favourable seasons excellent crops of this wholesome vegetable have been produced by this method.

Some Facts About Tea.

A RECENT issue of the *Scientific American* contains the following interesting article by L. Lodian on the subject of tea.

Notwithstanding the almost universal use of tea, folk in general know very little about it—certainly little beyond that they drink a decoction of it, usually of the cheaper grade, known as "mixed tea"—rarely a properly made infusion; and thrifty housewives use the refuse tea-leaves to "lay the dust" in sweeping. With the innumerable uses to which tea is put in other countries they are unacquainted.

In China, tea-leaves are also used in sweeping floors, but this does not end their utilitarian purposes. In regions where fuel is scarce the refuse leaves are pressed into bricks, dried, and used in the same manner as blocks and peat. This fuel is particularly prized for pork-curing, and the tea-cured or tea-smoked meat is to the Chinese what beech-nut and sugar-cured bacon and ham are to us. The ashes from the fuel are used as a fertiliser. But even before its use as fuel, the refuse tea serves another purpose. The leaves are vigorously stewed or allowed to steep in cold water in order to recover the tannic acid which they contain (about 12 per cent.) This is used in tanning leather and in dyeing textiles. It gives a fine, permanent nut-brown colour, requires no mordant, and is unaffected by sunlight, bleaching, or washing. Sometimes the refuse tea-leaves are used as fodder for farm stock—at least providing bulk if not much nutrition. Again, they may be dried, mixed with the low-grade, factitiously-scented teas of commerce, and are then known as "lie-tea." The decoction resulting from such tea cannot be far superior to one made from the common hay with which we are all acquainted.

The queerest use to which brick-tea has ever been put in the Orient is in the capacity of money. We find mention of this peculiar form of currency in "Knight's Mechanical Dictionary," in the "Encyc. Americana," and in "Abbe Huc's Travels in Tartary, Tibet," etc. It is still in circulation as a medium of exchange in the far-inland Chinese towns and in Central Asian marts and baazars, southward to the Pamirs and Tibet, and northward across Mongolia to the Siberian Frontier. Between the Mongolian town of Urga and the Siberian town of Kiakta, there is still as much as half a million taels of this money in circulation. At the latter place it ceases to be used as currency, and enters into the regular brick-tea trade of Siberia and Russia. As brick-tea, it is largely used in the Russian Army by surveying engineers, touring theatrical companies, travelling hunters, and sportsmen and tourists in general.

The value of the specimen illustrated in the engraving (not reproduced) is about 2 taels, say, 9s. 5d.; it is a high-grade bohea or black tea. The farther it gets from the eastern tea-growing regions, the more its value increases. By compressing more expensive teas, similar-sized bricks are produced, representing values of £2, £4, £6, and upward. According to Abbe Huc, payments in Tartary are generally made for all commodities in brick-tea currency. Many of the highest-grade Chinese teas never leave the country—that is, are never exported in commercial quantities. Tea specialists in Europe and America manage to obtain specimens through corresponding firms in Chinese export centres, but these samples are not for sale. These rare teas are preserved for occasional comparison and testing with the general commercial teas; they are known as "unexported teas." I have known of only one person (outside the tea-producing countries) who supplies the trade or the general public with specimens of the rare teas. His prices range from £15 12s. 6d. to £20 16s. 8d. per pound. As not even an expert can safely judge such tea by its appearance alone, it is necessary to taste it in the cup before purchasing. The vendor can hardly afford to dispense this £20-tea gratuitously, so a charge of 4s. 2d. to 6s. 3d. per cup is made; and as a judiciously-prepared infusion allows the making of about 200 cups per pound of tea, the profit from this tasting is almost gigantic. On rare occasions, exceptionally valuable teas, sold at auction in London, have brought from £47 to £57 per pound. But these fancy prices—almost literally worth their weight in gold—are rarely seen by ordinary people; they are preserved in sealed glass jars in the safes of the tea specialists who own them. Such exceptional teas are worth the high valuation placed upon them, and the purchases are not merely the results of some fad, for London's tea-centre experts include some of the shrewdest tea-connoisseurs living. Tea, not from the leaves, but from the flowers alone of the plant, is rarely encountered in commerce. The petals, stamens, etc., are semi-dried, and the resulting tea is of a rich, deep-brown hue of peculiarly delicate odour, and gives a pale amber-coloured infusion rather more astringent than that from the average fair-grade leaf. The taste for it is an acquired one, and even if this tea could be made commercially possible, it is doubtful if it would ever become popular. The American tea trade could advantageously take a suggestion from the brick-tea of the Far East. In our country, the tea-dust, some of which is of good quality, is not properly utilised. In Europe it is a regular article of trade, and is advertised and sold as tea-dust. In America it is sold to thousands of cheap restaurants, who make it the mixture of tannic acid, sugar, and boiled milk which they sell as "tea." If, as in the Orient, this dust were compressed into bricks, good tea could be made from it, and the product would find a ready market through the multitude of uses for which it is adapted. A beginning in this direction has been made by the Pinehurst Tea Estate in South Carolina, and in Europe similar advances have been inaugurated.

The virgin tea (*biepjcki-chi*), so called from its use at Chinese weddings, is the semi-dried leaf intact, tied up with three strands of coloured silk. After infusion, these fagot-like bundles are pickled in vinegar and used as salad. This tea is sold in especially handsome silk-covered and glass-covered boxes. The rarest of all teas, and one that has never been known to reach this country, is a naturally sweet tea, produced in Western China on a very limited scale. Its culture is centuries old, and the secret has been jealously guarded from generation to generation. The saccharinity is probably due to grafting and years of patient study and care, such as only the small Chinese tea-farmer is capable of bestowing. The "body solidity" of Chinese teas is said to be far superior to that of the Indasian product. Experts claim that if Chinese teas and those of India or Ceylon be comparatively tested, it soon becomes apparent that the cup qualities of the latter are far more ephemeral, while those of the former are far more staying. This is believed to be the result of the tea-culture in India and Ceylon on large plantations by means of hired coolie labour, where there is no incentive to personal effort in the betterment of the product. In China, on the other hand, tea-raising has, since time immemorial, been conducted by small farmers, each owning a few acres of land, and bestowing upon his crop his entire time, labour, and intelligence, knowing, as it were, the condition and peculiarity of every bush; and this intensive culture has resulted in bringing the body-solidity of the tea to a remarkably high state of perfection. This is one of the reasons why we hear of Chinese teas—never Indasian ones—sometimes bringing more than £20 per pound. In late years the plantation and coolie system has been introduced into China by foreign concerns controlling the entire output of large tracts of country. The result has been the partial deterioration of Chinese tea, but China will probably always be able to hold her own with regard to the production of the higher-grade leaves.

In buying tea, a good rule for the uninitiated to follow is never to pay less than 4s. per pound. Numbers of firms sell teas at 8s., 16s., and 25s., and these are usually worth the price, though it is possible to purchase really good tea for 4s. Fair grades of leaf may be obtained for 3s. and 2s., but those selling under the latter value are not worth considering. It is very rare, by the way, to find good teas in small grocery stores, as these have not sufficient call for them to warrant carrying a stock. The leading kinds of black teas are *Peko*, *Kongu*, and *Suchong* (*Cianchang*). "Peko" is the Chinese word for "down," in reference to leaves so tender that they are still covered with a soft down—Nature's protection for the budding leaf against sudden and undue chill. Among green teas we have the imperials, hisons, formosas, ulongs, etc. The latter are sometimes classed among black teas, though ulong is really a green tea of blackish leaf. The Chinese themselves class it among green teas.

Oil from Mealies.

THE following is an extract from the *Orange Judd Farmer* on the subject of corn or maize oil:—

"Within comparatively few years a considerable industry has been developed in extracting oil from corn and placing it on the market. In answer to a question from a subscriber, who wishes to know to what extent oil is extracted from corn and sold for commercial purposes, it may be stated that 3,000,000 gallons to 5,000,000 gallons represent the annual product. Corn oil is used to some extent for culinary purposes, is manufactured into substitute for India rubber, is used as a lubricating oil and in the mixing of paints. The last Federal census report contains the statement that 75 per cent. or 80 per cent. of the amount of oil manufactured in this country is exported.

"Writing us specifically on this subject, C. P. Hartley, in charge of corn investigations, Department of Agriculture, at Washington, says for the year 1906 the exports of corn oil reached a value of $1,172,206. The exports in the fiscal year 1906 were 3,108,917 gallons, valued at a little less than $900,000. In 1904, the business was about the same proportions. In 1903 there was exported from the United States a total of 3,778,000 gallons of corn oil, valued at $1,467,493."

Maize Cultivation in South Africa.

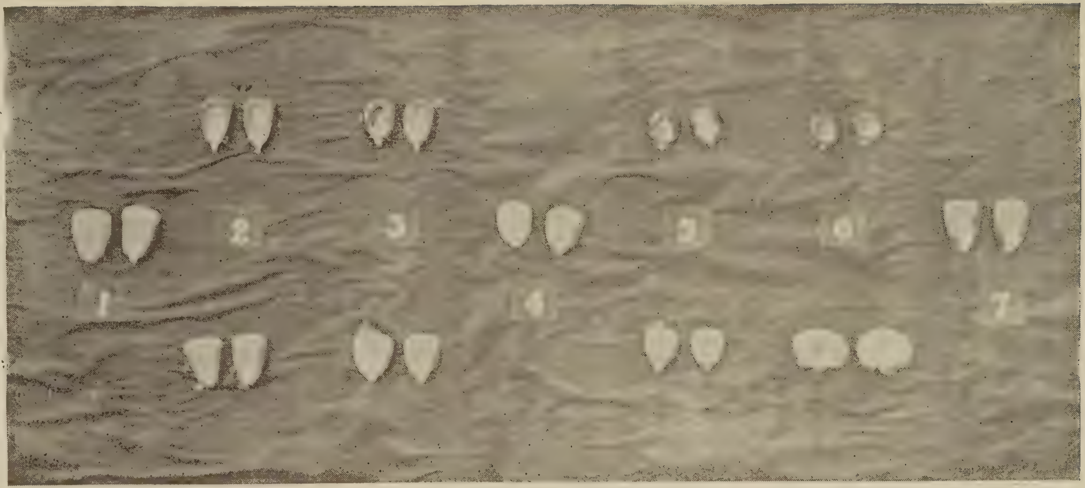
WITH SPECIAL REFERENCE TO NATAL.

By E. R. Sawer, Director Experimental Stations.

HARVESTING.

An index to agricultural development in South Africa is furnished by widespread improvements in the methods of harvesting maize. The primitive system of allowing the ear to fully mature in the field and feeding the dried stalks to stock on the land, which was induced by the limited distribution of snow and severe frosts, is rapidly losing favour in view of the proved economies of other methods. Stock-owners are handicapped by a dry winter, during which green pasture is scarce, but the advantage of conditions favouring the growth of the maize crop in summer more than offsets this, and is sufficient in itself to place South Africa in the forefront of dairying and beef-production. No other crop can compare with maize in the cheapness and ease with which it may be grown, nor in the quality of valuable food-material produced to the acre. Harvested in the form of hay, stover or silage, it furnishes roughage which may replace the roots and fine grass-hay fed by the English breeder, while the grain, apart from its direct market value, is the most palatable and readily digested of concentrated stock foods. The kernels carry considerable oil and are full of starch, both fat-formers, and, if fed in conjunction with bean or pea meal, which furnishes the protein necessary to muscle formation, will provide all the nutriment necessary for filling the tissues of the steer's body with fat and for rendering the muscles tender and juicy. The development of a successful industry in steer-feeding in Natal depends upon cheap maize and cheap bran, from which may be secured a complete and well-balanced ration, all the constituents of which are to be raised on the farm. Failing the institution of some such general system of stock-feeding, the problem of maintaining the fertility of maize lands will become increasingly serious. When the crop is grown entirely for grain and the latter marketed, little or nothing is returned to the ground, which is repeatedly cropped year after year. The constant employment of high-priced fertilisers is therefore the alternative to a system of stock-feeding. Where the latter is adopted nitrogen is secured by the growth of bean, while potash and phosphate may be largely returned in the valuable manure derived from maize rations.

The method of harvesting the maize crop will therefore be determined by the nature of the farmer's operations. When a dairy herd or butcher's stock are to be fed, the stalk and leaves of the plant may to a certain point prove more valuable than the grain which might be de-



SELECTION OF SEED MAIZE.

No. 1.—Shape or kernel associated with greatest proportion of grain of best quality—bluntly wedge-shaped.

No. 2.—These kernels taper too much towards germ end, there being loss of space against cob. They are however well-shaped at outer edge, leaving little space between rows.

No. 3.—Too rounded at either end, leaving wide spaces between rows on exterior of ear and also against cob.

No. 4.—The germs are small and ill-defined. Such kernels are unsuitable for seed, as germination will be feeble and faulty.

No. 5.—As broad as long. There is a loss in weight of grain owing to lack of depth.

No. 6.—Broader than long. Unless the cob be very large the weight of grain furnished by such kernels is very much less than where the kernels are deep and wedge-shaped.

No. 7.—Kernels damaged by weevil. These are unsuitable for seed, as germination is generally impaired.

rived from the crop, in which case the latter will be sacrificed for hay or silage. Or a dual purpose may be served, the grain being shelled and the stalks conserved in the form of shredded stover. In each case the farmer's object should be to secure his crop in the best possible condition for his purpose with a minimum outlay for harvesting operations.

MAIZE HARVESTING MACHINERY.

The employment of labour-saving machinery in harvesting operations is an essential feature where the crop is cut for stover or silage, and, though no one would wish to recommend the purchase of a plant which could not be used to something approaching its full capacity, an increase in the scale of operations spells a large decrease in the cost of production. A first improvement upon the maize-knife is the Drag-Cutter, consisting of a sled or low-wheeled carriage to either side of which is affixed a scythe-shaped knife. Some of these cutters are so devised as to allow men riding upon the machine to gather the cut stalks and bind them in movement. They are simple in construction and can be put together by any blacksmith. A further development in the same direction is the Maize Harvester, which cuts and binds bundles of stalks, and by means of a bundle-carrier attachment collects the bundles until sufficiently numerous to form a shock, when they are thrown out at the side of the machine. A second pattern builds the shock upon a platform, after which it is automatically raised by a derrick and placed upon the ground out of the way of the machine on its next round.

The Husker and Shredder, which is coming into general use, obviates the labour and cost of husking, and shreds the stalks into palatable stover. The maize is tabled from the wagon and is automatically spread out on a web: this carries it to the snapping rolls, where the ears are snapped off and drop through spaces to the husking rolls, one set of which are provided with pegs and the other with groves. The ears are here rotated until clean of husks, when they pass on to a carrier, which elevates them into a wagon. If the grain be quite dry some quantity will be shelled, but the more recent machines are equipped with riddles and a grain elevator, which sacks the grain in a nice, clean condition. In the meantime the stalks, after leaving the snapping rolls, come into contact with the cutting head, and emerge as fine shreds which go over a shaker into the blower, and through the blower pipe into the barn or stack.

A power Silage-Cutter of one of the many satisfactory types now on the market is essential where a silo is to be filled. Maize may be used uncut, but is more difficult to pack and subsequently remove, and it is not possible to stove the same quantity in a given space. In South Africa elevators of two types are in use, namely, the direct lift and the blower. The latter, though requiring rather more power to operate, gives better distribution of the material in the silo, as the mouthpiece can be directed to any point. A large cutter, capable of handling from

25 to 30 tons an hour and driven by a fifteen-horse-power engine, costs from £60 to £80. Smaller machines may be driven by horse-gear or hand.

Though the time has hardly yet come when large Power-Shellers with a capacity of 100 bags or more an hour will be regarded as a profitable investment, a better type of small machine with force-feed, winnower, elevator and sacking attachment, is a desideration. The small hand-sheller is very wasteful of labour and the resulting grain frequently dirty. Where no husker or shredder is employed, a pattern of shredder which also strips the husk would be found advantageous and labour-saving. An opening exists for the organisation of a jobbing or co-operative industry in this and similar harvesting operations, whereby a single power-outfit with large capacity might do the work of shelling or shredding throughout a district possessing passable roads at a recognised rate per bag per hour.

TOPPING AND STRIPPING.

A practice which is gaining ground in many parts of South Africa is that of cutting the stalks of the maize above the ears for stock feed, while in the southern United States it is customary to strip the leaves from the plant shortly before these begin to "fire" or wither. The question is frequently raised as to how far these operations influence the yield of grain. "The Pennsylvania Station found that by topping 1,050lbs. of stover were obtained at a loss of 540lbs. of grain. Mississippi Station, as the result of three years' trials, found a nett loss in feeding value of more than 20 per cent. Seven other stations show an average loss of thirteen bushels per acre, which was more than the feeding value of the fodder secured. Eight stations report a decrease of from 10 to 20 per cent. as a result of pulling."*

MAIZE HAY OR FODDER.

Where neither silage nor shredded stover can be prepared, the whole plant may be cured in the shock as hay and fed to stock as a combined roughage and grain ration. This fodder, however, is not so well relished nor so cleanly eaten as shredded stover or silage, and greater loss occurs in curing. The stage of development of the crop at the time of harvesting is in this, as in other cases, a matter of the first importance, and an effort should be made to cut at such a time as to secure the largest quantity of palatable and digestible fodder. An idea is very prevalent that no increase in weight or quantity of food substance takes place after the grain is "in milk," or fit for green roasting. This, however, is erroneous, for numerous careful experiments show that the plant continues to gain in weight of dry matter until fully mature, and that the most rapid gain is made while the grain is glazing.

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* "Cereals in America": Hunt

WATER AND DRY MATTER AT DIFFERENT PERIODS.*

Stage of Growth.	Maize per Acre.	Water per Acre.	Dry Matter per Acre.
	Tons.	Tons.	Tons.
Fully Tasselled	9·0	8·2	0·8
Fully Silked	12·9	11·3	1·5
Kernels Watery to Full Milk	16·3	14·0	2·3
Kernels Glazing	16·1	12·5	3·6
Ripe	14·2	10·2	4·0

* Henry : "Feeds and Feeding."

From the above table it will be seen that the yield of dry matter has almost doubled after the grain had reached the milk stage, and that heavy loss would have resulted from harvesting the crop at that stage. Not only is the yield increased by allowing the plant to mature, but, contrary to general opinion, the resulting fodder is more digestible.

DIGESTED FROM 100 PARTS OF ORGANIC MATTER.*

	Maize, Hay, or Fodder. Average.	Silage. Average.
Cut before Glazing, 13 experiments	65·7	67·4
Cut after Glazing, 10 experiments	70·7	73·6

* Jordan : "Maine Exp. Station."

A modification of the principles adopted for the curing of grass and millet hay is therefore necessary, and the crop should be allowed to mature until the leaves begin to fall. A common method of hand-shocking is to tie the stalks of four plants together without cutting and then to shock the rest of the bundles around these; in other cases a three-legged wooden horse with one detachable limb is used as a temporary support. When the shock is finished a light rope with a hook at one end is used to draw the top together, when it is tied with a stalk or twine. The first shocks should be small, to hasten curing, and it may be found convenient to cut the field in alternate strips, adding the later-cut fodder to the outside of the partially-cured shocks. Curing may be furthered by leaving the crop in the swathe or small bundles for a week, for maize does not suffer to the same extent as grass-hay from dew or rain. Where stacking is contemplated, the crop should be field-cured for at least a month before carting, or heat and mould will almost certainly develop in the rick. The fodder is best fed to stock at nights, when the beasts will work it over, sorting out the ears and consuming a larger or smaller quantity of stalks and leaves.

SHREDDED STOVER.

The husker and shredder is having in the corn-belts of America an even more revolutionising influence on general agriculture than had the silo. In South Africa but few machines are at present in use, and those lacking in the more modern improvements, which is to be the more regretted as the system undoubtedly obviates heavy losses of valuable feed which ensue wherever field-husking from the standing crop prevails. On an average 300lbs. of palatable shredded corn-hay or stover, worth from £3 to £4 a ton, may be secured for every muid of grain shelled. This may be baled and marketed, stored in a barn or put into a stack. The only precaution necessary is that the crop be thoroughly field-cured and dry before shredding, as the stover is otherwise liable to heat in the stack. As in the case of the hay-crop, cutting should be postponed until the grain is at least partly glazed, and the lower leaves begin to wither.

SILAGE.

Maize has done more than any other crop to popularise the cause of silage; it is the ideal silo plant, and breeders have devoted attention to its further improvement along lines calculated to give the best possible results when the crop is thus employed. As already stated, several of the local varieties, now in general cultivation, with a leafy, heavy-eared character, are eminently suited for this purpose. An average yield is about twelve tons of silage to the acre, though this is frequently much exceeded. As in the above cases, the crop should be allowed to approach maturity, when the yield of dry matter will be greater, the percentage of water less, and the silage sweeter. Formerly it was a practice to cut the maize when quite green, but of late years the desirability of waiting until the grain is glazed, or even dented, has been generally recognised. Ensiling increases the digestibility of the food, and especially of the fibre, and in this respect is a preferable process to field-curing. As an offset, however, there is always some loss from fermentation which varies with the maturity and water content of the crop. From the feeder's standpoint there is little comparison between the two, as the succulent character of the silage has, apart from its chemical composition, a markedly favourable influence on the milk-flow of dairy cattle and the carcase of butcher's stock.

Silage is generally cut into half or quarter-inch lengths. Some feeders, however, prefer one inch or one and a half inch cut, as they state that the smaller pieces are liable to cause soreness of the mouth in cattle, particularly if the material be hard. Shredded is considered by many to be better than cut silage in that it can be packed closer, and is in better condition for feeding. The difference between so-called sweet and sour silage is due to variations in the temperature obtaining during fermentation. All silage contains a certain amount of volatile acids, of which sweet silage contains a small proportion due to the existence of a temperature ranging between 130° and 160° F. The nearer maturity the crop, the greater is the chance of securing sweet silage, for the crop has a smaller content of water, which is associated with less development of acid. The amount of air present also affects the character of fermentation, and slow filling is sometimes resorted to with the object of increasing fermentation and raising the temperature. When power-plant is in use, however, this involves an undesirable delay. The higher the temperature up to a certain point, the sweeter the silage, but the greater the loss of food material, and it is therefore a moot point whether it be necessary to take any further precaution than to harvest the crop in a suitably mature condition, when all the silage will be palatable, although not necessarily "high temperature sweet." "There are six advantages in allowing the plant when intended for silage to arrive at the stage of maturity indicated: (1) Greater yield of water-free substance; (2) less weight to handle; (3) less loss in silo; (4) superior composition; (5) greater digestibility; (6) greater palatability; resulting in a greater feeding value per acre at less cost."*

SILOS.

In Great Britain, Europe and Australia, a general practice exists of placing silage in open-air stacks, pressure being secured by weights or rachets. Supporters of this system contend that the loss is no greater than the interest on a silo structure. In South Africa, however, it is a general experience that the losses have been very heavy, amounting in some cases to as much as 50 per cent. In addition, the labour involved in building a stack is very much greater than putting the same amount into a silo. Where this method is adopted, care should be taken to place the stack in a sheltered spot, as greater loss invariably occurs at the side exposed to prevailing winds. A wooden platform with rachets and wires attached at six points on the sides will be found a convenient structure.

Stone or cement-lined pits, which are a development of the most primitive form of silo, may be found at a number of centres in South Africa, and have given good results where provided with ample drainage. The greatest objection to this type is the difficulty of removing the silage for feeding, and fifteen to twenty feet is usually regarded as an economic limit to their depth. Where placed in the open, a hay stack is frequently built above the silage, after this is well settled, and assists in conserving the latter.

Of surface silos, which are now almost universally built in cylindrical form, there are three principal types, the wooden, the stone, and the brick. The choice of materials will in most cases be determined by their relative cost. The wooden silo is generally the cheapest, and it is to be hoped that wattle-wood after careful seasoning may furnish suitable timber for this purpose. In America, cypress, white pine, and Douglas fir are the chosen woods, and the silo is built of staves kept together by hoops, with a stone foundation and concrete bottom sunk to varying depth below ground level. Where building stone is cheap and plentiful, this may be adopted with the same foundation and base, and similarly strengthened by embedded iron bands. Brick silos do not commend themselves for local purposes.*

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* Hunt: "Cereals in America"

The size of the silo will depend upon the number of animals to be fed with an economic minimum of 24ft. in depth and 16ft. in diameter. A cow in milk should be allowed a ration corresponding to a cubic foot of silage per diem, and upon this basis the requirements of all stock upon the farm can be calculated. The following tables will furnish a guide when planning and building a cylindrical surface silo:—

NECESSARY DIAMETER OF SILOS FOR FEEDING DIFFERENT NUMBERS OF COWS WHILE REMOVING 2 TO 3·2 INS. SILAGE DAILY (KING).

Number of Cows.	Silo 30 feet Deep. Mean Depth Fed Daily, 2 inches.				Silo 24 feet Deep. Mean Depth Fed Daily, 3·2 inches.			
	Contents.		Round Diameter in Feet.	Square Sides in Feet.	Contents.		Round Diameter in Feet.	Square Sides in Feet.
	Tons.	Cubic Ft.			Tons.	Cubic Ft.		
30	108	4,091	15	12 x 14	108	5,510	17	16 x 16
40	144	6,545	16·75	14 x 16	144	7,347	20	18 x 18
50	180	8,182	18·75	16 x 18	180	9,184	22	20 x 20
60	216	9,818	20·5	18 x 18	216	11,020	24	22 x 22
70	252	11,454	22	20 x 20	252	12,857	26	22 x 26
80	288	13,091	22·5	20 x 22	288	14,691	28	24 x 26
90	324	14,727	25	22 x 24	324	16,531	29·75	26 x 28
100	360	16,364	26·5	24 x 24	360	18,367	31·25	28 x 28

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* Detailed plans and specifications for silos of any of the above types will be gladly furnished by the writer to farmers requiring same.

(*To be continued.*)

Correspondence.

HELLEBORE FOR KILLING TICKS.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—In reply to your question, I use six of fat or oil to one of hellebore, in a liquid state. I generally use butter, for the simple reason that there is no sale for it down here, but it is one of the worst fats you can use, as it melts off too soon. I find rough cattle castor-oil the best and cheapest. You require a sticky oil which will remain on the skin and hair, and for that purpose you cannot beat rough castor-oil. Hellebore is apt to blister if made any stronger. It has served me better than all other remedies which I have tried.—Yours, etc.,

W. H. STAFFORD.

WHEN DID LUNGSICKNESS COME?

To the Editor of the "Agricultural Journal."

Sir,—I wonder if you or any of your readers can say (if the question is worth the trouble) at what time Lungsickness first occurred in Natal. Cachet, in his "Worstelstrijd der Transvaalers," gives as one of the causes that led to the abandonment of the Colony by certain of the voortrekkers in 1848 that the natives allowed their cattle, "often infected with the disease," to roam at large. I have had the impression that its introduction took place at a later period.—Yours, etc.,

J. Y. GIBSON.

Mahlabatini, 10th March, 1907.

[We regret to say that we have not yet been able to procure a satisfactory answer to the question. There are several old colonists who remember inoculating at the latter end of the Fifties. Any authentic information will be welcome.—Ed., *Agr. Jour.*]

HYACINTHS, ETC.

To the Editor of the "Agricultural Journal."

Sir,—Last year I planted some hyacinth bulbs, but did not succeed with them. I planted them in tins filled with good manured soil, and they started seemingly thriving well, but bore only a few stunted flowers, after which they decayed. Can you inform me of their proper treatment with regard to soil, watering, sun and shade, time of planting, and whether they can succeed in our climate, especially here on the Coast? Also, with regard to rearing them in water, whether hyacinth glasses are to be got here anywhere, and how the flowers are to be treated in them?

I would feel also grateful to you for your advice on treatment of Begonias and Gloxinias. Will Lilies of the Valley and Tulips succeed here?

Thanking you in anticipation,—Yours, etc.,

AMATEUR.

New Germany.

[Hyacinths were formerly grown with complete success at their nursery gardens in the Chase Valley by Messrs. Wilkinson. Messrs. Wilkinson say that they think the Coast climate may be too hot for successful hyacinth-growing. The soil should be good loam—say 1 part well decayed manure, 1 part leaf mould, and 1 part sand. In planting, cover the bulb half way up—to the crown, give no water until after growth has begun; the drainage should be good. Shelter is essential; also shade, but not such as that to be got from planting under trees.

For the other questions "Amateur" had best seek local advice. There are many in Durban competent to give it; Mr. Wylie, of the Botanic Gardens, would, we are sure, be pleased to give "Amateur" all the information wanted.—Ed., *Agr. Jour.*]

Gardening Notes for April.

By W. J. BELL, Nurseryman, Florist and Seedsman, Maritzburg.

FURTHER sowings for succession may be made of Cabbage, Savoy, Kale, Beet, Carrot, Lettuce, Radish, Turnip, Endive, Spinach, Mustard and Cress, and Onion.

All varieties of herbs may now be sown, such as Thyme, Sage, Marjoram, Savory, Parsley, Lavender, Rosemary, Rue, Wormwood, etc.

When only small quantities are required, the best plan is to sow in boxes or tins. When large enough, the young seedlings should be pricked out a few inches apart into a well-prepared bed of sandy soil, from which they may when larger be finally planted out into permanent quarters.

The Parsley may be sown in the open ground where it is required to grow.

Lavender thrives best in a poor, dry soil without manure, and must not be over-watered.

Plant out Cauliflower, Cabbage, Brussels Sprouts, Savoy and Celery.

The latter should be planted in trenches, which should be dug out not less than two feet in depth. Fill in with about 12 inches of good soil and well-decayed manure in equal proportions, and plant the young Celery plants nine inches apart.

Earth up as required Peas, Broad Beans, Cauliflower, Cabbage, etc.

During spells of dry weather give Peas abundant supplies of water, with occasional applications of liquid manure when commencing to pod.

Give Asparagus beds a good mulch of decayed stable dung after cutting down the old stems.

FLOWER GARDEN.

Sow all varieties of hardy flower seeds for winter and spring flowering. The hardiest and quickest to bloom after sowing are Candytuft, Calendula, Petunia, Sweet Alyssum, Pansy, and Dianthus.

Sowings may also be made of Aster, Aquilegia, Antirrhinum, Campanula, Carnation, Clarkia, Coreopsis, Delphinium, Eschscholtzia, Gaillardia, Godetia, Larkspur, Linum, Mignonette, Nicotiana, Nigella, Phlox Drummondi, Poppy, Salpiglossis, Scabious, Sweet Sultan, Ten Weeks and Brompton Stocks, Sweet William, and Wallflower.

Of the Poppies, the Shirley, Mikado and Giant Oriental are the best.

The flowers of the latter are of the most gorgeous colours, often six inches across, and grow to a height of three or more feet. The seed requires to be sown very thinly, and must, if necessary, be thinned out to two feet apart. The other varieties are more dwarf in habit, and may be left about a foot apart.

The seed of the Perennial Phlox should now be sown as it ripens, as it will not retain its vitality for long.

Freesia seed should be sown this month, and will flower in spring.

Daisy, Cowslip, Polyanthus, Primrose, Forget-me-not, Pentstemon, Carnation should be sown in boxes and carefully shaded and watered.

The planting of spring flowering bulbs should be completed this month, such as Anemones, Ranunculus, Narcissus, Daffodils, Bermuda Lilies, Freesias, Agapanthus, Gladiolus, Hyacinths, Ixias, Tulips, etc.

When planting Anemones dig the soil at least eighteen inches deep, and introduce a good deal of grit or sand, as they will not succeed in a stiff, cold soil. Light half-decayed manure is also required, when the plants will become a picture and the bulbs will improve for the following season.

Plant the bulbs about six inches apart and two inches deep. Be sure that the growing end of the bulb is planted uppermost. This is sometimes difficult to distinguish in the Anemone bulb. When planted upside down, which is not uncommon, much disappoinment follows.

The depth which various bulbs require to be planted varies considerable, and failure often occurs through improper planting. The following instructions, which give the depth the crown of the bulb should be planted, may be taken as a guide:—

German Iris, one inch.
Anemone, nearly two inches.
Ranunculus, two inches.
Tulip, three inches.
Gladiolas, four inches.
Narcissus, two to three inches, according to size of bulb.
Liliums, Hyacinths and Amaryllis, four inches.

District Reports.

MTUNZINI, 28th February.—Since my last report the name of this Division has been altered to "Mtunzini," so much confusion having arisen with Umlalazi and Umlazi Division. The weather, on the whole, for this time of year has not been bad, and I am glad to say the mouth of the Umlalazi River still keeps open, consequently the mosquitoes are scarce. The hopper locusts are all well on the wing, and a great deal of damage has been done in the last three weeks—really it is cruel to see the way the crops have been eaten off in places. Mr. Ashby has started hay cutting on his farm adjoining the Town Lands here, and it is to be hoped he will be successful in the new venture. So far the Division still remains free from all cattle diseases. No horses died in this neighbourhood during the month.

C. C. Foxon, Magistrate.

NEW HANOVER, 15th March.—The worst hailstorm within the memory of the oldest resident passed over the Division of New Hanover on Thursday night, the 14th inst. It started near the Impolweni River and travelled towards the village of New Hanover, increasing in its violence as it advanced. At New Hanover the storm divided, one wing going towards the north and the other easterly. I have never known a hailstorm cover such an enormous stretch of country and do so much damage. There was a terrific wind accompanying the hailstorm, which accounts for its destructiveness, but the hail was also the size of pullets' eggs. The mealies, mabele, and kitchen gardens were devastated. Where there had been fields of beans looking most promising there was nothing to be seen after the storm had passed over. Poultry was killed, but, considering the violence of the storm, it is surprising what small numbers were killed. Several horses have died during the last month of Horsesickness. I have heard of no deaths among cattle or other stock; all are in the best of condition. The locusts, I regret to report, in some parts of the district have completely destroyed the native crops. The sum of £444 has been collected in Poll Tax from Europeans up to date.

H. W. Boast, Magistrate.

Alexandra Fibre Company, Ltd.

The first general meeting of shareholders in the above Company was held in Messrs. Duff, Eadie & Co.'s office on Monday last at noon. Mr. F. E. Turner presided, and there were present Sir George M. Sutton, Messrs. D. A. Shaw, C. H. Stott, J. T. Taylor, A. C. Wearner, L. A. Keller, J. W. Buchanan, John Laird, J. M. Allan Hay, H. Baker, E. A. Hall, and others. The Chairman reported that an amended agreement had been come to with the vendor, Mr. N. Harper, whereby he accepted 4,040 fully paid £ shares in payment of the two farms to be handed over to the Company. He considered this a much more satisfactory arrangement than that at first proposed, as the Company would now have an unencumbered property, and the interest on debentures would be saved. It was proposed and carried that Sir George M. Sutton and Messrs. F. E. Turner, J. M. Allan Hay, and John Laird be the first directors of the Company, together with Mr. N. Harper as managing director. Mr. R. A. Dix was elected as auditor, and the directors were instructed to complete and register the articles of association and to take transfer of the property. It was further resolved that the directors be empowered to issue the reserve shares to the extent of one thousand to approved applicants at not less than par, and up to any date before the next annual general meeting. This concluded the business. At a meeting of the directors held immediately afterwards, Sir George M. Sutton was elected Chairman of the Company, and Mr. F. E. Turner Deputy-Chairman.—*Mercury.*

Immunisation of Mules against Horsesickness.

THE following, by Dr. A. Theiler and Mr. C. E. Gray, respectively Government Veterinary Bacteriologist and Principal Veterinary Surgeon, Transvaal, appears in the current issue of the *Transvaal Agricultural Journal*:—

The fact that rendering an animal immune gives him a certain protection has served as a basis for the inoculation against this disease (horsesickness), which was introduced into practice over a year ago, and we are now able to immunise mules against horsesickness by a simultaneous inoculation of serum and virus, but we have not yet been able to apply the same method with equally successful results to horses. It seems that the mule, although as susceptible to the disease as the horse, more quickly recovers than the latter, and it is evident that the factor which helps him is due to some inherited power of resistance transmitted by his sire, who, as we know, although susceptible to horsesickness, very seldom dies from it.

This method of inoculation has been applied during the last year to some 3,000 mules in all parts of the Transvaal and Rhodesia. The results have been very satisfactory, and total loss from the inoculation having only amounted to 3·8 per cent. We have every reason to believe that it will be possible to improve this inoculation at some further period, and also to reduce the mortality to almost nil.

Since the introduction of this method, horsesickness has been very virulent in various parts of the country, and our mules have stood a very severe test, with the result that only 6 per cent. of the immunised mules again contracted horsesickness. The fact has been the starting point of a new series of experiments, which have confirmed the observation that animals may contract horsesickness more than once, and the so-called "aanmaning," or relapse of a healthy horse or mule, is no longer a doubtful phenomenon. Various strains of horsesickness virus have been collected, but experiments have been made more especially with three, and the fact remains that equines, although immune against horsesickness, may be reinfected twice, three times, or even more. We are not able to break down the immunity of a mule or horse by the injection of such enormous quantities of virus into its system as is necessary to kill 10,000 horses, provided that the virus used in the test injection is of the same kind against which the animal was immunised; yet we are able to overcome the immunity with a comparatively small quantity when the virus is of a different strain. There are accordingly in South Africa various strains of virus of horsesickness, all of which are similar to each other, but differ in the respect that immunity obtained from one strain does not protect against another strain. This explains the varying virulence of the disease of different districts and localities, and is of great importance, and the discovery of this fact was a severe set back to our work, because we find it is necessary to devise a method of immunisation which will protect animals against all strains of virus, a task which hitherto we have not been able to accomplish completely, but as only ·6 per cent. of mules have died in practice after inoculation, it seems that our virus is probably of the type which is most common in the Transvaal, although there may be certain strains against which our virus may not be strong enough to protect, therefore our method of immunisation will only be perfect when we are able to protect animals against all the different virus encountered in South Africa. Meanwhile we are continuing to immunise with the strain of virus which is most commonly found.

Veterinary Departmental Reports for Month of February, 1907.

MINISTER OF AGRICULTURE,—

I forward herewith my monthly report for the month of February:—

Sheep Scab.—During the month ten licenses were raised:—Estcourt, 1; Umvoti, 8; New Hanover, 1.

Seven flocks were placed under license:—Klip River, 1; Weenen, 1; Umvoti, 1; Krantzkop, 1; Lion's River, 1; Ixopo, 1; Harding, 1.

Fifty-four flocks are still under license.

With reference to sheep entering over our Borders under the Amended Scab Act. As regards sheep entering for *bona fide* winter grazing, it is hoped, subject to your approval, that sheep entering from the Cape Colony, Orange River Colony and Transvaal coming into districts of Natal used for this purpose, we shall be able to arrange with the respective Colonies for their entry and return, subject to their being inspected and certified by a Government Veterinary Surgon or Stock Inspector of the Colony they are leaving that they are free from Scab and have been inspected within ten days of crossing the Border. The Chief Inspector of Scab, Cape Colony, has signified his approval of this in so far as Alfred County is concerned, and the Principal Veterinary Surgeon, Transvaal, in so far as Utrecht and Vryheid districts are concerned, and it is hoped that the Orange River Colony authorities will see their way to fall into line as regards Klip River County.

East Coast Fever.—During the month 14 fresh outbreaks of this disease have occurred, as follows:—

Vryheid district, one farm became infected, viz., Tractaat.

Ngotshe district, two farms became infected, viz., Waterfall and Langerwacht.

In Umvoti district one fresh outbreak on the farm Krantzkloof, which was undoubtedly an extension of the disease from the farm Bon Accord.

In the Dundee and Umsinga districts six fresh centres of the disease, viz., the farms Zwaartwater, Rooifontein, Knostrop, De Vryheid, Pomeroy Town Lands, and the Oscarsberg Mission Station.

In Zululand four fresh outbreaks occurred, one at Nqutu and two in the Nongoma district, and one at Eshowe.

In the Stanger and Mapumulo districts the whole of these two districts are looked upon as infected areas, and all more or less infected. The disease is gradually spreading over the whole of these districts.

In Durban County no fresh centres of infection were reported during the month.

In the Vryheid and Ngotshe districts, although only three fresh farms were reported to have become infected, the spread of the disease has been gradual and sure, and we can, I think, expect to see many more farms become infected during the next few months before the winter sets in.

Babanango district, which is looked upon as part of the Vryheid district, is still free from infection, and the public of that district are rendering us all support possible in endeavouring to prevent the ingress of cattle.

Regarding the fresh outbreak in Umvoti County, only one animal died. The outbreak occurred in a paddock adjoining an infected paddock on the farm "Bon Accord." The animals concerned in this outbreak have been removed on to clean veld, passing through temperature camps. It is hoped that in Greytown and Krantzkop districts we shall be able to modify the restrictions on the entire prohibition of movement of cattle when the infected areas have been completely fenced, and when the fence around the locations in these districts have been completed. It is hoped that the locations and infected areas fences will be completed at an early date.

With reference to the outbreak in the Dundee and Umsinga districts, the seventh outbreak shown in Mr. Bruce's report occurred on the farm Vergelegen," and, as this farm was reported as infected on the 4th September, 1906, I am not showing it as a fresh outbreak in my report. You will see from the report of Mr. Bruce that all these fresh outbreaks occurred on farms adjoining infected areas, with the exception of one on the Pomeroy Town Lands.

In Zululand one fresh outbreak occurred in the Nqutu district, but, as you will see from Mr. Bruce's report, he also suspects the existence of the disease at Neeneeni Mountain and at Isandhlawana. The source of infection of these outbreaks is traceable to loot stock, and there is no doubt that, owing to the nature of the country in these districts, the disease will continue to spread there. The outbreak shown at Eshowe occurred amongst some cattle which came from Nqutu under permit from the Magistrate, as provided under the regulations, and left that district before the recent outbreak occurred there. Among the five head which went to Eshowe one animal was noticed to be sick a few days after arrival, and died shortly afterwards. This was a positive case of East Coast Fever. All the animals in the area over which these cattle grazed in Eshowe have been removed through a temperature camp, but there is a possibility that the beast referred to might have been capable of infecting the veld before arriving at Eshowe, as four days after its arrival it was found to be visibly sick. The other outbreak occurred in the Nongoma district. Apart from these two outbreaks, which occurred outside the flagged area, there have been 28 fresh in-contact troops of cattle showing cases of East Coast Fever amongst them. One fresh outbreak occurred on the south side of the Black Umfolosi and the other outside the infected area of Nongoma, towards Hlabisa. A fresh suspicious case occurred in the Hlabisa district, which was not shown to be definitely a case of East Coast Fever last month, but we have positive evidence this month.

In the Paulpietersburg district the temperature camp system is still being adopted. The disease appeared amongst a fresh troop of cattle on an already infected farm during the month, and these cattle were removed.

Deaths from East Coast Fever during the month were as follows:—

Stanger and Mapumulo	1,345
Umvoti	6
Durban County	60
Vryheid and Ngotshe	375
Dundee and Umsinga	51
Mahlabatini	74
Paulpietersburg	48
Nongoma and Hlabisa	836
	2,795

In the Stanger and Vryheid districts, which includes Ngotshe, the deaths shown are only approximate, and they undoubtedly are in excess of those shown.

With reference to the branding of cattle in the infected areas, this has been completed in the infected area of Umvoti County, and will in a few days be completed in the infected area of Weenen County also. In Dundee, Stanger, Paulpietersburg and Durban County it is also being proceeded with. In Zululand arrangements are not yet completed for enforcing this.

From the above returns of deaths reported, you will see that the total mortality from East Coast Fever during the month was approximately 2,800, but probably it would be nearer 4,000. In view of this high mortality, it is to be regretted that individual owners did not see the policy of disposing of their cattle from infected districts for slaughter purposes, whereby both themselves as individuals and the country as a whole would benefit to the extent of the value of such stock for butcher purposes in place of total loss. Of course, many of these owners are natives, who hold quite original ideas regarding disposing of their cattle, particularly if the amount they are to receive for them is problematical.

Lungsickness.—During the past few months this disease has made its appearance in Weenen and Umvoti Counties. Up to May last only one centre of infection existed in the whole of Natal, viz., in the Nqutu district of Zululand. The outbreaks which have occurred in the two above-mentioned counties occurred amongst cattle which had been on Militia transport in Zululand. In the case of the Umvoti cattle, although the outbreak was not known to exist until January, deaths, I understand, had occurred and were not reported, prior to this. The several centres of infection in the Greytown district now existing emanated from the one common source of infection, viz., Mr. P. R. Nel's cattle, and at present eight separate troops of cattle in this district are under license for Lungsickness.

During the month 24 deaths have occurred in Umvoti County from this disease, and, having regard to the fact that this district has been free from this disease for a considerable period, the cattle there are highly susceptible both to the disease itself and to the effects of inoculation, and we must, in consequence, maintain a firm hold over the quarantine on these cattle to prevent any possible extension.

It is much to be regretted that our Lungsickness Act does not provide for a longer period of quarantine than six weeks, as it is a fact that the incubation period of this disease may extend to three months, and therefore it is to be regretted that the Act does not provide for the destruction of all cattle which may recover from this disease, as there is no doubt that recovered animals are a source of future infection. In so far as my Department is concerned, however, we shall refuse to release from quarantine any animals which we know to have recovered from the disease, as we can rightly claim that they are still in a diseased condition, which can be proved at any time by *post-mortem* examination. It is therefore urged that both in the interest of the owners and the public those possessing animals which may recover from Lungsickness should dispose of them as soon as possible for butcher purposes.

Lungsickness is at present very prevalent in the Cape Colony, particularly in the native territories of the Transkei, and there is no doubt we shall have at an early date to take protective measures against the introduction of this disease into the Western districts of Natal. This is particularly necessary, having in view the fact that these districts have been free from this disease for years, and the cattle are, in consequence, highly susceptible, and the introduction of this disease would be attended with considerable mortality.

Horsesickness.—The mortality reported from this disease is truly alarming, and is, as was anticipated from all quarters this season, proving a record one, and appears to be one of those which visits even the recognised healthy horse districts periodically after a lapse of a number of years. There can be no doubt that the excessive rainfall after seasons of apparent drought has exercised a very considerable influence over the present prevalence of this disease. We may say at the present time that we are practically at the height of the season, and the mortality will continue and probably increase until early in May. It is known that the months of March and April are invariably those during which the mortality is highest, and, further, when this disease is prevalent in the up-country districts the coast districts appear to be suffering less, but I think the fact is that the usual mortality is taking place, but is masked by the unusual mortality occurring up-country.

During the past three months we have been busy in Maritzburg and Durban inoculating mules against Horsesickness. In Maritzburg, as you will see from Mr. Power's report, 210 mules have been inoculated, with a loss of 3 per cent. In Durban, 541 mules have been inoculated, with a loss of 39 animals as the result of inoculation. This loss principally occurred amongst the first batch of 75 mules inoculated, where a loss of 16 animals occurred. The virus was found to be too strong, and was abandoned in consequence. In connection with this particular virus, it is remarkable that the same virus was used in the Transvaal with great success, only 9 mules dying out of a total of 400 inoculated. The virus we then resorted to with much better results was the same strain as the above mentioned, but came from a mule, whereas the other came from a horse.

We have now issued many immunised mules all exposed among others night and day in badly infected Horsesickness locations, and so far we have lost one animal showing positive signs of Horsesickness, and this mule had been running with a hundred others near Maritzburg night and day; none of the others have shown any signs of sickness. As Mr. Power points out, in the Transvaal they have lost 17 mules out of 5,000 after immunisation.

There is no doubt that this year will be a most severe test to the immunity conferred on mules by this method of inoculation, and I have no hesitation, from the practical experince of the Transvaal, in anticipating that the results of this exposure will be satisfactory. We know that individual animals will die of Horsesickness, or get sick and recover after being inoculated when exposed to infection stronger than the virus used for inoculaton purposes, but, taken in the aggregate, as proved in the Transvaal, these losses will not be of any serious account. Of course, an individual owner who may be so unfortunate as to be singled out to lose an immunised mule will consider that his case is a hard one. In this connection, we shall be very glad if any owner of an immunised mule losing an animal, or has one sick from what he thinks is Horsesickness, will send us a small quantity of blood (2 or 3 ozs.) We can then satisfy ourselves if it is a case of this disease, and we are particularly anxious to obtain blood from such animals, as the strain of virus will prove to be stronger than in ordinary cases. I put up return of deaths from Horsesickness, and it is interesting, showing the mortality from the various districts. These are not the total deaths, only those actually reported, and probably the true estimate would be nearer 500:—

Newcastle	11
Greytown	30
Vryheid	25
Port Shepstone	40
Pietermaritzburg	150
Durban	35
Dundee	10
Mooi River	34
Ladysmith	4
Underberg	12
Paulpietersburg	6
Nongoma	8
Lion's River	4
Eshowe	5
Melmoth	2
Mahlabatini	3
Ixopo	1
Umlalazi	1
Verulam, a few cases reported.	
Total	381

Blue Tongue in Sheep.—As a rule, with a season such as the present, showing a great mortality from Horsesickness, Blue Tongue in sheep is very prevalent. They appear to be recognised as two diseases, being in all probability the same medium of contagion, and conditions favourable to the one are favourable to the other.

The return of deaths put up is not claimed to be anything more than approximate, and there is no doubt that the actual death-rate is very much in access of this. With a year such as the present all sheep-farmers will realise the necessity for inoculation against this disease, which should be carried out early in the summer before cases of the disease occur. To adopt the system of inoculation when the disease is causing considerable mortality is very unsatisfactory, and apt to bring the system into ill-repute.

DEATHS REPORTED FROM BLUE TONGUE IN SHEEP.

Utrecht	250
Vryheid	100
Pietermaritzburg	40
Mooi River	50
Ladysmith	10
Ixopo	60
Paulpietersburg	50
Total	560

I put District Veterinary Surgeons' and Stock Inspectors' reports.

S. B. WOOLLATT,
Principal Veterinary Surgeon.

STANGER.—D.V.S. DONALDSON.

East Coast Fever.—Total deaths from East Coast Fever in Lower Tugela and Mapumulo districts (reported) from 2nd February to 2nd March, 1,345. Total number of cattle railed for slaughter, 103. This is irrespective of the Militia oxen at Bond's Drift, which have all been railed and the camp closed. I have also closed down the last Otimati Camp, and handed the natives their cattle back. I have started branding cattle at Mapumulo and Chaka's Kraal, and am awaiting brands to start at Durnall, Tugela, and New Guelderland. I have placed a quarantine officer in command of the Tugela Border from Bond's Drift to Bulwer.

NEWCASTLE.—D.V.S. HUTCHINSON.

Glanders.—A case of Glanders was reported from Utrecht in a horse belonging to W. Muller. This animal died of the disease, but I was able to make a post-mortem, and found extensive lesions both in the nostrils and the lungs. This animal had been in contact with five others, which I submitted to the Mallein test. One of these, a brown gelding, reacted, and was destroyed, glanders lesions being found on *post-mortem* examination. This animal was an N.D.M.R. horse, and was insured in the Militia. It is quite possible that the infected horses may be found to have been in contact with other horses before purchased by Muller, and inquiries to this effect are still being conducted, and, if found to be the case, the other in-contacts will be tested. Besides the above, a further number of 24 mules and 8 horses were subjected to the Mallein test.

There are no other cases of contagious or infectious disease of any serious nature to report.

From two to three hundred sheep are reported by the Stock Inspector at Utrecht as having died of Blue Tongue, and it is to be hoped that owners where the percentage of deaths are heavy will avail themselves of the opportunity of securing vaccine for the purpose of inoculating against the disease.

This district has so far been exceptionally free from Horsesickness, only 11 deaths having been reported during the month.

GREYTOWN.—D.V.S. CORDY.

Scab.—One outbreak only has occurred during the month.

Lungsickness.—Four fresh outbreaks have occurred during the month in the Inadi portion of the Krantzkop Divisioa. The source of infection is thought to be the transport cattle of Mr. P. R. Nel, These fresh outbreaks are all among native cattle in the Inadi Location, and I therefore anticipate many more outbreaks before the disease is stamped out.

In all about twenty-four deaths have occurred. Three of the troops have already been inoculated, and the fourth will be done as soon as suitable virus is procured.

East Coast Fever.—One fresh outbreak has occurred on farm Kranskloof among a troop of eighty cattle. One cow died, and the remainder have been temperatured and sprayed and removed to clean veld, where they are being put through a temperature camp. The site of this outbreak is a paddock on the west of the Greytown-Muden road, and adjoining the infected paddock of Mr. Edwards, at Bon Accord. During the month six deaths occurred in the infected area. Native guards have been stationed on all the roads leading from the infected area to prevent cattle from straying into or out of this part of the Division. All cattle in the infected area are being branded as fast as possible, about three thousand having been done at the end of the month.

I visited this area during the month with the Magistrate, who addressed a large meeting of the natives, explaining the nature of the disease, the regulations in force, and the reasons for same.

Horsesickness.—About thirty deaths among horses and five among mules were reported during the month.

Twenty horses were examined for the Militia during the month.

Several convictions have been obtained for breach of regulations in connection with East Coast Fever, and others are pending.

VERULAM.—D.V.S. McNEIL.

Contagious disease has been limited to Horsesickness and Biliary Fever among horses.

East Coast Fever has claimed no further victims in the district during the past month.

My time has practically been taken up in getting round and finding out my district. I have made a tour of inspection of the native guards, the loot stock at Ndwedwe, the quarantine officers, etc.

VRYHEID.—D.V.S. BECKETT.

Horsesickness.—This disease has been very prevalent in the district under my charge; 25 cases have been reported, but this does not give any idea of the actual mortality during the month, which must have been at least double this number.

Blue Tongue in Sheep.—100 cases reported.

East Coast Fever.—The spread of the disease has been gradual, but none the less sure. Only three fresh outbreaks have been reported. Babanango district is still, so far as we know, clear of this disease, and if the quarantine line is strictly maintained along the Vryheid border there is little danger from that zone. The difficulty of guarding a line of this nature about 100 miles long with a small staff is great, and quarantine could doubtless be broken by anyone determined to get cattle through. Discovery would follow too late to be of use. I consider that rigorous measures should be at once adopted in case of any suspicious movement, and any cattle found inside quarantine zone should be destroyed immediately. A lesson of this kind may insure strict herding of kafir cattle near the boundaries, and possibly prevent contemplated movement.

PORT SHEPSTONE.—D.V.S. TYLER.

East Coast Fever.—As regards East Coast Fever there have been no fresh developments, and things are so far in a most satisfactory condition. The Cape border has been thrown open to cattle from Alfred County, and the guards have been removed from the Umzumbe to the Umzimkulu River.

This has been a very bad month for Horsesickness, nearly forty deaths having been brought to my notice.

The health of stock in general has been good.

MARITZBURG.—D.V.S. HARBER.

Sheep Scab.—Three flocks of sheep are under license for this disease.

Mange.—A few cases are in quarantine for this disease in horses and goats.

Blue Tongue in Sheep has been the cause of about 40 deaths in the Richmond district.

Horsesickness has been very prevalent, upwards of 120 animals having been buried in February in Maritzburg. Several cases, about 30, are reported from the surrounding districts.

Mallein.—Sixty-three mules and six horses have been tested with Mallein.

Forty-five mules have been subjected to the immunising process against Horsesickness. Of these two were private mules.

Biliary Fever.—One case of this disease was treated and recovered.

A cow was treated for evagination or eversion of the vagina, due to weakness. The subject was a Cape cow due to calve very shortly. The organ was replaced and kept in position by a truss, and tonics were administered. I understand she has since calved without difficulty.

DURBAN.—D.V.S. AMOS.

The importations by sea have been as follows:—

Sheep	6
Dogs	10
Horses	57
Goats	3
Total	76

The sheep came from England. Australia, and Germany. Dogs from England. Horses, 50 from Australia, and seven from England. Goats came from England.

Glanders.—Thirty-nine horses have been tested, and eight donkeys. One horse and two donkeys reacted and were destroyed. All these reactions were animals recently arrived from the Transvaal.

Horsesickness has been very prevalent indeed, especially in the Pinetown and Sydenham districts; approximately, 35 deaths have resulted, the majority dying from the pneumonic form.

East Coast Fever.—This disease has remained well in hand, one fresh outbreak only occurring, and that within the original infected area.

Sixty animals have died from this disease.

Biliary Fever.—Several cases of this disease have occurred, and one valuable horse has died. The other cases have recovered under treatment.

During the month I have been fully occupied immunising mules, grading cattle at Jacob's, and general supervision.

DUNDEE.—D.V.S. BRUCE.

East Coast Fever.—In the Dundee-Umsinga area seven fresh outbreaks occurred, the majority of these being traceable to sick cattle, having been travelled from the distributing centre in this area, namely, Weltervreden. The outbreaks occurred on farms adjoining infected areas, with the exception of the one at Pomeroy Town Lands, and the farm Vergelegen, the latter being due to cattle straying back on to infected veld, but also adjoining infected veld. The names of the farms on which these outbreaks have occurred are as follows:—Stockholm, Zwartwater, Giba, De Vryheid, Knostrope, Rooifontein, Vergelegen, and Pomeroy Town Lands. Some of the owners have disposed of some of their cattle for slaughter purposes, and the remainder are in temperature camps. With the exception of the outbreak on the Pomeroy Town Lands, these outbreaks do not make any great difference to the actually infected area here, and the fencing in of same is still being proceeded with. About four months ago the greater part of Pomeroy Town Lands was cleared of cattle, and the clear veld is being used for the treatment of cattle in this vicinity. The Dundee Town Lands have been cleared of cattle, about 50 head being placed in a temperature camp, the remainder being sold or confined to the owners' fenced in erven. A few cattle in a paddock adjoining the Dundee Town Lands remain infected. Originally the number in the paddock was thirteen head, seven of which now remain, but the owner is informed that his cattle will be cured as they get sick. A gentleman in this town has treated eight known cases of East Coast Fever on the Town Lands. Seven of these have died, and the one appears to be recovering, but it was on a fair way to recovery before his treatment was adopted. He is said to have treated several other cattle, all recovering, but the cases mentioned above are the only positive ones which he has treated that I know of. In the Nqutu district outbreaks of East Coast Fever exist at Vant's Drift and Nqutu, and in my opinion also at Nceneeni Mountain and Isandhlawana. The source of infection in these cases is traceable to loot stock, with the exception of that at Vant's Drift, which is due to oxen working on Royston's transport. Nqutu district is practically an unfenced native location, and we may expect further outbreaks in this district. Temperature camps here are out of the question, and the natives will not sell their cattle unless the sale of these is made compulsory. At the present time in the Dundee-Umsinga district the department is spending a large sum of money in guarding, temperature camps, etc., but the value of this work is very much lessened by not being able to deal in a proper manner with these fresh outbreaks. Those farmers in the Dundee-Umsinga and Utrecht districts whose farms are properly fenced in stand every chance of not getting East Coast Fever amongst their cattle, but the outlook for the others is a serious one. The number of deaths from East Coast Fever during the month is 51.

Lungsickness.—One fresh outbreak in the Umsinga district, and the cattle have been quarantined and inoculated. Number of deaths during the month, 11.

Redwater.—Ten deaths.

Gallsickness.—Fifteen deaths.

Quarter-evil.—Four deaths.

Horsesickness.—Ten deaths.

Other Causes.—Thirty-two deaths.

Scab and Mange.—Several flocks are under license, especially in the Nqutu district.

MOOI RIVER.—D.V.S. VERNEY.

East Coast Fever.—This disease has been somewhat quiescent during this month, but this was to be expected, as it is too early for the ticks that have dropped from the previous sick animals to have completed their moulting. I anticipate more deaths during the ensuing months. The fencing is progressing, and the whole of the infected pasture is now enclosed with a good barbed wire fence, and this, combined with the branding of the cattle on this infected area, will, I hope, be instrumental in confining the disease to its present position. Mule wagons have been working during the month from Mooi River to Middlerust, as all ox transport has been prohibited in this area.

Horsesickness.—This disease has occurred to a somewhat alarming extent on some of the highest farms in the Mooi River district, and commencing so early in the season it is certainly suggestive of a much worse period before the advent of frost. It is noteworthy that on all these farms where the disease has appeared mosquitoes have abounded in enormous quantities. On some of the farms where horses have died there have been no cases since 1893, and it would be interesting to know where the infection has been during this interval. It is to be regretted that the organism of Horsesickness is not demonstrable, as then it would be comparatively easy to follow, especially assuming the mosquito is the carrier. In all probability the organism sporulates, and these spores are capable of lying dormant until certain conditions exist which are necessary for their introduction into the animal body, similating Anthrax spores, etc.; 34 deaths are reported.

Lungsickness.—During the month the licenses from all contact animals on western commonage were raised. Mr. Bird's herd is now under license for another six weeks owing to an ox developing the disease and recovering.

LADYSMITH.—D.V.S. WEBB.

Ladysmith and Bergville districts appear to be very free from diseases of all kinds. There have been only a few cases of Horsesickness up to the present; a mild form of Blue Tongue in sheep is reported from Bergville district.

Scab.—No sheep are under license in Bergville district. In Ladysmith district two flocks are under license.

Immunisation of Mules in Natal.

To Dr. Theiler belongs the credit of having discovered a practical method of inoculating mules against Horsesickness.

This method, now being carried out in Natal, has been very largely practised in the Transvaal during the past couple of years, and with success, as proved by the fact that inoculated mules are now living in districts so unhealthy, that it practically means certain death for any uninoculated mule taken there. When in Pretoria a couple of months ago I was given—thanks to Dr. Theiler—every facility for making myself familiar with the operation and all the details of the process, and during that time I learnt how highly this work was appreciated by the farming community. In fact so pleased were they with the results obtained previously that I believe every farmer who keeps a mule in an unhealthy locality has it inoculated. The principle of the system is the simultaneous injection of virus and serum. At present it is only applied in practice to mules, but it is hoped that a method of inoculation may be perfected for horses at an early date.

Over 200 mules have been inoculated in Maritzburg, and 3 per cent. have died from the disease whilst undergoing treatment, *i.e.*, during the period of twenty-one days after inoculation. Animals are not allowed to work during this period. The majority of those mules have now been issued and are working in nearly every Horsesickness area in Natal, and some are also in Zululand, and as the disease this season is exceptionally virulent and almost general throughout the Colony the immunity conferred will be put to a severe trial. If those animals can withstand the infection of this season, and all practical evidence from the Transvaal goes to prove that they will, there is no doubt that the method will be very largely adopted in Natal in future. Of the 200 mules discharged from here as immunised only one death has occurred so far from Horsesickness, and this animal had been running night and day with about 100 others in a very unhealthy part and at the time when the majority of the horses died in that locality although stabled. It has been proved both experimentally and in practise that the virulency of Horsesickness infection varies in different districts, and animals immune in one district may contract the disease in another, *i.e.*, a stronger infection exists in some districts than others. For example, mules may be immunised in Maritzburg with virus obtained locally. Those animals would then be immune here, but if taken to Zululand or elsewhere may encounter a stronger virus and contract the disease.

This experience is known in practice with horses that have suffered from the disease in one district and known to be "salted" there, but when taken to another locality have contracted the disease and died. The aim then is to obtain a virus that will not cause too high a mortality during the process of immunisation but which will confer an immunity capable of withstanding any infection likely to be met with. Dr. Theiler has informed me that out of 5,000 mules inoculated this season seventeen have died from Horsesickness after being discharged. When it is considered that those animals are all living in Horsesickness districts and many of them running at night it will be seen that the "break downs" above referred to are rare, but as such cases are liable to occur it is well that those interested should be aware of it.

W. M. POWER, D.V.S.

Maritzburg.

Importation of Trout.

THOSE who have followed the successive steps taken for the introduction of trout into the streams of Natal will be interested to hear results of the last importation. Much of our trout ova has hitherto been imported from the hatcheries in Cape Colony, but another attempt has just been made to import ova direct from Britain.

At the beginning of the year two cases, each containing 15,000 brown trout ova, were obtained from the Howietoun Fisheries Co., Sterling, Scotland, and consigned by the Agent-General to Natal. They reached

Durban about the middle of February in good condition, not more than 400 of the eggs having died in transit. One of the cases was consigned direct to Mr. Drummond's farm, Allerdean, Ingogo, where hatching boxes had been constructed in readiness to receive the ova. The second case was sent to Mr. J. C. Parker's hatcheries at Tetworth.

In spite of great care taken in handling and unpacking these cases, and adjusting the temperature of the water, the ova have all perished.

Mr. Parker ascribes the want of success attending this latest experiment, as compared with earlier attempts, to import trout ova, mainly to the changes of temperature experienced by the ova. In 1890-1892 the hatching boxes were in the bush on Mr. Hutchinson's farm, Boschfontein. The stream that supplied the water, Mr. Parker says, never rose above 61 deg. Fahr., which is 11 degrees cooler than the stream at Tetworth. In the year 1890, 40,000 ova were imported, from which 1,442 fry were hatched, equivalent to 3·5 per cent. In 1891, 75,000 ova were imported, from which 3,363 fry—or 4·4 per cent.—were hatched.

"From past experience it can be clearly shown," Mr. Parker writes, "that the best results are to be gained by importing ova from Cape Colony, where they are gathered in the winter. Then they have no sudden shocks and changes of temperature to suffer, the stream here (Tetworth) having a temperature of 48 deg. in the month of August."

This is shown by the fact that in 1899 fry representing 42 per cent. of the ova imported from Cape Colony were hatched at Tetworth and were placed in streams in Natal.

Sack-Filling and Weighing Machines.

THE probability of an abnormal mealie crop this season, and the consequent prospects of a large export trade being done, suggests the desirability of economy in the handling of the grain. The attention of the Department of Agriculture has been called to various apparatus designed for the filling of sacks, weighing, etc. One of these is Abery's patent automatic weigher, which will weigh into sacks any given net weight of grain and keep a tally of the number of sacks weighed. This saves considerable time in filling sacks, and also obviates the extra handling for weighing and tallying into railway trucks. Another of these machines is a patent sack-filling and weighing apparatus. This also fills sacks to any given weight of grain, and keeps an account of the number of sacks filled and weighed. The mealie-silo of Messrs. Lawes, Maritzburg, is provided with automatic scales; see page 333, Vol. V. Such machines as these, though naturally expensive, would probably be valued by co-operative and similar associations, and might be purchased by the collective funds of the members. Particulars regarding agents, prices, etc., of these machines may be had on application to the Department of Agriculture.

Natal Fruit in London.

PACKING OF PINEAPPLES.

In connection with the experimental consignments of fruit which were despatched recently for the South African Exhibition in London, the Minister of Agriculture has received a preliminary report from the Agent-General relative to the shipment of pineapples.

The pines, which were carried as deck cargo, were unfortunately nearly all in an unmarketable condition when opened. Many of them, though outwardly of good appearance, were found to be badly discoloured when cut open. The pines which were sent in cold storage were in much better condition. Both deck and cold storage pines were, however, too mature.

The Agent-General emphasises the necessity for leaving a fair portion of the stalk on each pine, and adds that the pines which were received in the best condition were those in which this course had been adopted. The Agent-General's opinion has been confirmed by the leading fruit brokers whom he has lately seen. It does not appear necessary to seal the stem, as was done in one case.

Another noticeable fault in connection with the pineapples consigned to England was that of excessive packing. In some cases, the Agent-General states, an additional layer of pines could have been inserted without any harm being done.

Care should also be taken to have cases marked "This side up, with care," as in many cases the tops of the pines had been badly crushed owing to the cases being kept upside down during the voyage.

The Cultivation of Chillie Peppers.

How the Plants are Grown.—A hot bed is made by excavating about 16 inches deep; fill in to within 4 inches of the top with damp stable manure, tramping down very solidly. Spread about 4 inches of sandy loam over the manure. The seed is sown quite thickly over the loam, and then about ½ inch of loose sand soil placed evenly over it, and all kept damp. When the plants have two or three leaves, thin to 1½ inches apart each way. The plants must be watered while in the hot bed by sprinkling. Great care should be taken to protect from frost.

Soil and Preparation.—Rich sandy loam is the best for the chillie pepper. It should be ploughed deeply, and be put in a state of thorough cultivation. Ridges should be made 3 feet apart, and the plants set 2½ feet apart on the ridges. All plants must be on a water line, and to get this the ridges should be made, water run down the furrows, and the plants about two inches above the water-mark. This insures every plant receiving water when irrigated. Plant as soon as danger from frost is over.

Cultivation.—Frequent cultivation is necessary until the plants get too large to allow of a cultivator and horse passing between the rows. All weeds must be pulled out. When the plants are set as above noted, all the ridges will be on one side. This must be worked down with a cultivator, and then a plough used to throw earth on either side of the furrow, so that the plants will be midway on the ridge.

Irrigation.—While the plants are small, water will be needed about once in 20 days, but as they get larger it will be needed as often as once a week, though only in small quantities. The plant seems to have no deep roots; consequently, the surface soil must be kept damp.

Picking.—The field should be gone over about once a week after the peppers begin to ripen, all that are fully ripe being taken off. Great care must be exercised to pick all the stem with the pepper. They should be allowed to lie in the sun one day after being picked, in order to toughen the stems and prevent them breaking during the process of curing.

Stringing.—The common method is to cut strings of strong, smooth twine 8½ feet long. Draw this through a needle about 12 inches long, which is often made of a bicycle spoke. Peppers having any break or blemish must be thrown away, as they would decay before drying properly. Of course, where an evaporator is used these can be saved. After the strings are full and tied they are hung on nails driven into a rough pole or other framework, standing about 6 feet from the ground, and left until dry; or, if shelter is available, they may be moved before becoming fully dry, and hung closely together under such shelter, but where there is a free circulation of air.

Evaporating.—Many growers prefer evaporating instead of drying. The evaporators used are of various designs and sizes, but they should be large enough when the peppers are dried on strings to hold not less than 500 strings. The usual plan is to have a furnace with several turns of 8 to 10 inch pipe in the basement, the peppers being placed in the second story over a very open floor with a good ventilation. The temperature must be kept at 110 degrees Fahr., and in this way the house can be refilled about every four days.

Yield and Price.—Both of these, of course, vary with the season, soil, and water supply. Two hundred and fifty strings of 5lb. each is called a paying crop; but, with all conditions favourable, including a late, warm season, as high as four hundred strings or even 2,400lb. per acre of dried peppers many be grown. Prices range from 70 cents to 1·50 dollars per string if sun-dried, and 15 to 25 cents per lb. if evaporated.—*Queensland Agricultural Journal.*

Meteorological Returns.

Meteorological Observations taken at Government Stations for Month of February, 1907.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.).				RAINFALL (IN INCHES).					
	Means for Month.		Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heav'st rainfall in 1 day.		Total for Year from July 1st, 1906.	Total for same per'd from July 1st, 1905.
	Maximum	Minimum					Fall.	Day.		
Observatory ..	84·1	69·6	90	64·1	4·06	16	1·43	11th	28·95	26·80
Stanger ..	87·6	69·3	106	64	4·39	15	1·14	24th	31·37	26·77
Verulam ..	93·9	70·9	105	61	6·63	12	1·75	10th	29·45	23·42
Greytown ..	92·4	49·6	105	39	8·34	15	1·6	4th	28·79	22·12
Newcastle .	84·7	61·9	94	53	13·47	15	2·95	4th	44·91	5·52
Ndwdedwe ..	79·9	63·0	90	57	6·02	15	1·69	26th	31·73	32·16
Estcourt ..	84·3	58·8	92	55	7·50	9	1·60	5th	24·41	22·82
Impendhle ..	..	..	..	..	9·84	19	2·34	4th	34·44	..
Mid-Illovo ..	80·3	62·7	94	57	9·45	16	3·74	4th	33·24	23·10
Camperdown ..	83·4	61·9	92	57	8·41	11	1·51	24th	31·14	..
Port Shepstone..	84·4	64·2	89	60	5·24	8	1·3	17th	30·62	3 ·40
Umzinto ..	87·9	54·8	93	52	12·92	11	6·66	4th	38·22	28·91
Richmond ..	82·0	60·7	94	57	12·87	17	4·09	4th	39·11	2 ·77
Maritzburg ..	83·8	62·0	95	51	12·92	17	3·25	4th	39·64	20·17
Howick ..	82·5	59·3	105	54	9·07	14	1·94	4th	33· 0	19· 6
Dundee ..	80·5	62·8	89	56	8· 9	16	1·58	18th	29·14	21·31
Weenen Gaol ..	89·5	61·9	98	57	7·27	14	2·27	24th	25·8	20·54
Charlestown ..	77·5	54·9	84	46	9·67	13	1·93	5th	45·12	..
New Hanover ..	83·5	60·5	93	53	12·73	15	4·30	16th	43·56	23·14
Vryheid ..	83·4	60·4	2	56	5·14	10	1·45	5th	3 ·95	..
Nongoma ..	83·4	52·4	91	40	3·96	8	1·65	4th	35·93	19·22
N'Kandhla ..	83·7	52·4	97	38	2·50	10	·86	3rd	26·33	21·32
Umlalazi ..	85·9	51·5	96	38	3·17	6	1·20	25th	..	24·49
Hlabisa ..	81·8	65·3	92	60	4·22	5	1·30	5th	36·91	23·35
Melmoth ..	82·2	63·7	94	56	4·28	15	1·50	5th	31·77	19·17
Ubombo ..	82·5	64·8	91	60	6·03	15	2·22	4th	41·69	..
Nqutu ..	81·5	60·3	84	54	7· 8	12	1·61	6th	..	16·91
Ingwavuma ..	80·5	61·2	87	58	10·49	13	2·43	3rd	..	..
Amatikulu ..	88·8	67·9	101	61	3·43	10	1·40	16th	22·80	..
Point ..	..	..	..	..	3·72	13	·98	10th	30·30	27·06
Empangeni ..	..	..	.	..	3·10	6	1·40	5th	26·87	24· 0
Maritzburg (Burger St.)	..	..	..	..	11·62	14	2·05	17th	38·95	..

Meteorological Observations taken at Private Stations for Month of February, 1907.

STATIONS.	TEMPERATURE (in Fahr. Degrees.)		RAINFALL (in inches).					
	Maximum for Month.	Minimum for Mouth.	Total for Month.	No. of days.	Heaviest Rainfall in one day.		Total for Year from July 1st, 1906.	Total for same period from July, 1905.
					Fall.	Day.		
Central Experiment Farm, Hill (Mangr.)	92	50	7·94	12	1· 5	3rd	30·68	16·86
Experiment Farm, Weenen (Manager) ..	95	55	7·35	13	2·44	24th	19·67	12·96
Experiment Farm (Winkel Spruit) (Mgr.)	88	63	9·27	14	..	2nd	33·96	29·39
Nottingham Road (C. J. King).. ..	..	..	7·50	20	1·56	12th	37·85	30·19
Adamshurst (Wm. Adams)	90	56	6·57	13	1·63	5th	26·68	17·71
Hilton (W. Engel)	90	54	8·77	14	2·63	4th	37·76	21·86
P.M.B., Town Bush Valley	..	..	10·73	15	2·29	4th	43·52	27·46
Mid-Illovo (A. N Montgomery) ..	94	57	9·45	15	3·74	4th	33·15	23·10
Ottawa (G. Wilkinson)	..	..	5·73	12	1·55	11th	30·18	..
Mount Edgecombe (Natal Estates) ..	96	65	5·32	11	·55	11th	34·76	25·72
Cornubia " ..	..	..	5·19	..	..	..	36·45	23·24
Milkwood Kraal " ..	..	..	4·57	..	..	..	26·26	19·92
Blackburn " ..	..	..	4·54	..	..	..	28·92	21·33
Saccharine " ..	..	..	4·99	..	..	..	30·87	24·15
Equeefa (W. Hawksworth)	97	66	11·90	13	3·80	3rd	41·83	29· 3
Umzinto, Beneva (E. W. Hawksworth)..	..	..	10·23	12	2·63	4th	39·44	27·26
Branxholme (Charles Scott)	..	..	9·80	13	1·52	6th	50·94	32·69
Riet Vlei (P. Otto, J.P.)	..	..	9·58	15	2·36	4th	25·20	..
Dalton (J. Pfotenhauer)	..	..	6·84	15	1·80	16th	29·52	.

Coal and Labour Return.

Return of Coal raised and Labour employed at the Natal Collieries for the month of February, 1907 :—

Name of Colliery.	Labour Employed. Above Ground. E.	N.	I.	Below Ground. E.	N.	I.	Unproductive Work.* E.	N.	I.	Output. Tons.	Cwt.
Elandslaagte	18	20	250	18	190	460	12	28	33	14,412	19
Natal Navigation ..	28	76	251	18	227	137	2	4	—	13,686	4
Glencoe, Natal ..	13	109	91	11	496	7	—	—	—	12,094	3
Dundee Coal Co. ..	17	12	172	9	72	352	2	—	65	11,539	13
Durban Navigation ..	21	128	43	11	311	45	—	20	—	11,190	—
St. George's	16	98	134	10	159	127	1	6	—	9,277	—
South African	8	15	94	11	200	65	5	19	40	8,175	4
Natal Cambrian ..	13	32	123	10	200	69	1	—	—	6,210	13
Newcastle	7	39	22	6	212	2	2	6	—	4,237	18
Natal Steam Coal Co. ..	1	57	4	2	158	3	—	3	1	2,734	—
West Lennoxton ..	5	1	63	2	30	96	—	—	—	2,029	14
Ramsay	2	5	60	3	48	108	3	5	8	1,870	8
Central	5	39	19	5	113	8	—	5	—	1,748	4
Talana (Natal) ..	3	10	28	3	58	71	2	4	5	1,468	17
Zululand	1	49	—	1	42	—	4	16	—	395	—
Woodlands	1	5	4	1	5	3	—	—	—	45	—
Signal Hill	—	—	—	—	—	—	1	3	—	32	—
Nooitgedacht	—	2	—	1	2	—	—	—	—	8	0
Totals	159	697	1,358	122	2,523	1,553	35	119	152	101,154	17
Corresponding month, '06	149	655	1,086	116	2,303	1,229	39	189	145	90,949	4

* Cost charged to Capital Account.

Maritzburg,
5th March, 1907.

CHAS. J. GRAY,
Commissioner of Mines.

Return of Coal bunkered and exported from the Port of Durban for the month of February, 1907 :—

	Tons.	Cwt.
Coal Bunkered	41,764	9
Exported to :—		
East London	2,974	2
Algoa Bay	979	15
Capetown	15,036	18
Swakopmund	58	0
Chinde	388	8
Mauritius	505	5
Total	61,706	17

(Signed) GEO. MAYSTON,
Collector of Customs.

Custom House, Port Natal,
1st March, 1907.

Some interest has been aroused in the island of Madeira as the result of experiments conducted by an Italian chemist, Professor Pagisci, who decleres that the juice of the fig under proper treatment can be converted into a wine of excellent taste. The professor states that its flavour is agreeable, that it is very rich in phosphate matter and almost wholly destitute of tannic acid, qualities that render it especially nourishing to invalids and children. The pulp is said also to create a new food for milch cows and fowls. The fresh fig contains only about 25 per cent. of sugar, but after it has been dried and prepared for the making of wine it yields 80 per cent. sugar.

Return of Farms at Present under Licence for Lungsickness and Scab.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
A. P. Craw	Ladysmith ..	Scab	Gengen	Roodeport
		,,	A. MacPherson ..	Avonford
		,,	V. Gama	Claypoort
. R. Cooper ..	Nkandhla & Nqutu	,,	M. Modweni ..	Dalalu
		,,	B. Butelezi ..	,,
		,,	B. Ndhlovu ..	,,
		,,	M. Ndhlovu ..	,,
		,,	C. Sekosana ..	,,
		,,	M. Gobose ..	Lower Blood River
		,,	S. Zungu ..	Delala
		,,	S. O. Molife .	Telezi
		,,	D. Ndhlovu ..	,,
		,,	M. Setole ..	Delala
		,,	M. Mgune ..	Blood River
		Lungsickness	L. Makoba ..	Middle Drift
		,,	N. M tenjeni ..	Nquebeni
S. A. Brown ..	Underberg ..	Scab	J. A. Stone ..	
		,,	T. de C. Arbuckle ..	Kerridge
		,,	B. Phipson ..	Strathcampbell
		,,	M. Fraser ..	Winterhoek
		,,	R. C. Gold ..	Woo end
		,,	J. R Royston ..	Greenend
		,,	J. van Whye ..	Silburn
		,,	F. A. Hathorn ..	Sau uana
H. van Rooyen ..	Vryheid	,,	Jonas	Witpoort
		,,	Mjebe	Fresgewacht
		,,	Machaba	Rooipoort
		,,	Mgeslo & Co. ..	Hardscamp
A. B. Koe ..	Portion of Estcourt	,,	H. J. Hatting ..	Servitude
		,,	A. W. J. Hatting ..	Koplagte
A. J. Marshall ..	Dundee	,,	R. J. du Bois ..	Giba
		,,	J. W, de Bruyn ..	Rooifontein
		,,	C. M. Vermaak ..	Paddock
		,,	L. W. Meyer ..	Langverwacht
		,,	A. L. Jansen ..	Strathearn
		,,	J. O. Nel ..	Earnscliffe
		,,	A. C. Vermaak ..	Sigtuna
		,	T. C. Vermaak ..	Harriotdale
		,,	H. Vermaak ..	Paddock
		Lungsickness	Govt. Loot Stock ..	Goodekeus
E. Varty ..	Western Umvoti ..	,,	W. J. Slatter ..	Holm Lacy
		Scab	H. Hansmeyer ..	On Rust
J. J. Hodson ..	Ptn of Lion's River	Lungsickness	A. K. Murray ..	Shawlands
		,,	Mrs Vear	Brookdale
		Scab	G. H. Burgmann ..	Bos l oek
R. Mayne ..	Krantzkop ..	,,	W. W. Mare ..	Doomhoek
		Lungsickness	P. R. Nell ..	Broeder's Hoek
		,,	Maqamganse ..	Loots Hoek
		,,	Uqupu	Myoniezwe's Locat'n
		,,	Ndabane .. .	,,
		,,	S. Johnson & Co. ..	Inadie Store
		,,	Ndabane	Myoniezwe's Locat'n.
		,,	Natives	Spitzkop
		,,	,, ...	Myoniezwe's Locat'n.
		,,	J. S. van Rooyen ..	Spring Grove
A. H. Ball	Weenen	Scab	J. J. Vermaak ..	Winterhoek
A. Brown	Polela	,,	L. Molefe	F. P. 142, Polela
L. J. Trenor ..	Harding	,,	R. Mack	Wetherby
G. Daniell ..	Vryheid ..	,,	J. R. Steenkamp ..	Bloemhof
		,,	G. Combrink ..	Goedehoop
		,,	D. Coetzee ..	Rustplaats
R. Mayne ..	Eastern Umvoti ..	Lungsickness	C. van Rooyen ..	Boschfontein
		,,	D. A. Nel	Glen Boig
J. Button	Portion of Estcourt	,,	J. Bird	Mooi River T'n. Lds.
H. C. Jarvis ..	Ixopo	Scab	Hulumana ..	Batman's farm

MANGE IN HORSES EXISTS AS UNDER.

Name.	District.	Name.	District.
W. E. Oates	Bergville	Nseleni	Underberg.
H. Turner	Lidgetton	A. G. Stafford.. ..	Harding
Mboyea	Bergville.	R. Thompson	New Leeds

Pound Notices.

The following cattle in the undermentioned Pounds will be sold on the 3rd April next, unless previously released :—

Finchley.—Black pig sow. Two black pigs, hogs. Two black and white hogs. The above pigs are presently on Mr. T. Deathe's farm "Sandford."

Weenen.—Black and white ewe goat, slit under each ear, described by Natives as "nseli."

Nkandhla.—One young male Kafir goat, brown colour, age about 3 months.

Estcourt.—One young red and white ox, no brands. Nineteen goats, left ear swallow-tail cut and two cuts below. Right ear, square cut out of front.

Market Reports.

(*Responsibility for the accuracy of the Statements and Opinions of the following Reports rests with the respective Contributors.*)

MARITZBURG.—Messrs. W. H. Walker & Co. write : Prices in every section of produce are on the decline, and there seems little prospect of them firming for some time to come. The Transvaal and the Orange River Colony bid fair to have record crops of mealies ; consequently will not trouble us for supplies ; in fact they may seek a market for their surplus grain in Natal. To send away 1,000,000 muids of mealies means the importing of sacks, which will involve an outlay of at least £25,000.

Mealies.—Prices vary between 10s. 6d. and 11s. 6d. per muid. There has been a heavy slump in mealies since the commencement of the month, and as the coast grain is coming in there is very little prospect of prices firming. Mealies at Johannesburg are about the same price as here.

Forage.—Fair demand, and prices range between 2s. and 5s. 9d. per 100lbs.

Hay.—Market abundantly supplied with good baled hay, from 10d. to 1s. 9d. per bale ; bedding, from 4d. to 7d. per bale.

Potatoes.—From 4s. 3d. to 6s. 9d. for good table varieties ; small samples from 2s. to 2s. 6d. per 100lbs. ; sweet potatoes, from 2s. 9d. to 3s. per sack.

Pumpkins.—Large quantities disposed of every morning at prices varying between 2s. and 5s. 9d. per dozen.

Kafir Corn.—Most samples offered are of inferior quality, realising from 5s. 6d. to 7s. per 100lbs.

Sunflower Seeds.—From 7s. 3d. to 7s. 6d. per 100lbs.

Tobacco.—From 5d. per lb.

Peas.—From 8s. 6d. to 12s. per 100lbs.

Onions.—From 5s. 9d. to 6s. per 100lbs.

Poultry.—Common fowls, from 1s. 6d. to 2s. 10d. each ; ducks, from 3s. to 5s. 9d. per pair

Butter.—Fresh butter from 11d. to 1s. 7d. per lb. ; salt butter from 9d. to 1s. per lb.

Eggs.—From 1s. 6d. to 2s. 9d. per dozen.

Fruit.—Market well supplied with apples, bananas, grapes, grenadillas, pears, peaches, plums, and pineapples.

Vegetables.—Abundance of good varieties disposed of every day, comprising beans, beetroot, bringalls, cabbages, carrots, chillies, cucumbers, eschalots, lettuce, peas, potatoes, radishes, rhubarb, and tomatoes.

Sundries.—Beef, 2d. to 6½d. per lb. ; mutton, 3d. to 8d. per lb. ; pork, 5½d. to 7d. per lb. ; salt beef, 4d. to 5d. per lb. ; bacon 3d. to 6d. per lb. ; rabbits, 1s. 6d. to 1s. 9d. each ; pigeons, 11d. to 1s. 1d. each ; and peacocks, 7s. 6d. each.

Firewood.—Poles, from 3½d. to 6d. each ; cut wood, 7½d. to 8d. per 100lbs.

DURBAN.—Mr. T. Burman, 99, Grey Street, writes :—

Mealies.—A fair number of new crop—coast mealies—are now offering, and, in consequence, the market is easier. New mealies are now being bought at 10s. per muid, and the market is likely to be easier each week.

Kafir Corn.—Supplies on hand are not large, and the market is fairly firm at 12s. 6d. per muid.

Fodder.—Large stocks still on hand ; price, £5 10s. per ton, with no prospect of an immediate rise.

Natal Hay.—Is now offering freely at about £1 15s. per ton.

Potatoes.—Price still remains low.

Wheat.—Stocks fair ; price, £8 5s. per ton.

Algerian Seed Oats.—Stocks are not large, and there is a fair demand at £10 10s per ton.

Cape Seed Barley.—Very little demand, and the price remains at £10 per ton.

Rice.—The price at Calcutta is still very high, and consequently the local price remains firm.

Grain Bags.—2¼lbs., are firm at 6⅞d. to 7d., less 5 per cent.

Imported Buckwheat.—The demand is not large, and price is £10 10s. per ton.

Onions (Cape).—Price 1½d. per lb. These onions continue to arrive in very good condition,

Flour.—Sovereign flour has advanced to £13 per ton, and price of Silverton flour is £11 2s. 6d. per ton.

Cape Bran.—Large stocks are not held, and an increase in price is likely.

JOHANNESBURG.—Messrs. Abinger, Keeling & Co., P.O. Box 564, report :—

Mealies.—Supplies to the morning market continue large, but are chiefly yellow and Basutoland mixed. White mealies, March requirements, have been taken at very low prices for white meal and mealies, but as supplies have not come forward freely stocks here are being very heavily drawn upon, which should cause a sharp recovery from the state of panic into which the market has fallen.

Kafir Corn.—Only mixed corn has come forward, some parcels weevily, and the morning market has been over supplied.

Forage.—Good clean in demand, 4s. 3d. to 6s. 6d.

Potatoes.—6s. to 12s.

Live Stock.—Oxen, slaughter, 6-700lbs, £10 to £13 ; medium, £8 10s. to £10 ; trek, £8 to £9 ; sheep, Merinos, 21s. 6d. to 25s. 6d. ; Capes, 21s. 6d. to 25s. ; lambs, 14s. to 16s. 6d. ; goats, 17s. 6d. to 24s. ; pigs, 3¾d. to 4½d., per lb., live ; mules, large, £20 to £26 ; medium, £15 to £18 ; donkeys, £6 to £8. Market well supplied ; demand good for prime oxen and sheep.

Hartman claims it to be "an undoubtable sign that a breeding horse is well bred and in good health when it is slow in development. Those which do not attain their complete growth until six or seven years are, excepting in case of accident, useful for twenty years or more, and may still be sound and healthy at thirty years. On the contrary, those which obain their growth in four years rarely pass the age of twenty."

Agricultural Shows.

HIMEVILLE, Thursday, 16th May.—President : H. C. Gold. Hon. Secretary : Thos. E. Marriott, Brookedale, Polela.

BULWER, Wednesday, 22nd May.—All entries close 10th May. President : J. Isbister. Secretary : D. McK. Malcolm, Bulwer.

ROYAL AGRICULTURAL SOCIETY, 13th, 14th and 15th June.—All entries close 1st June. President : Sir G. M. Sutton. Secretaries : Messrs. Duff, Eadie & Co., 12, Timber Street, Maritzburg.

ESTCOURT, Wednesday, 19th June.—All entries close 8th June. President : A. F. Henderson. Secretary : E. Cautherley, Southdowns, Estcourt.

HARDING, Thursday, 20th June.—All entries close 6th June. President : A. G. Prentice, J.P. Secretary : Thos. Tribe, Harding.

DUNDEE, Thursday, 27th June.—All entries close 12th Jane. President : F. Turton. Secretary : J. McKenzie, Dundee.

HOWICK, Thursday, 27th June.—All entries close 12th June. President : Graham Hutchinson. Hon. Secretary : Arthur F. Dick, Howick.

NEWCASTLE, Friday, 28th June.—All entries close 18th June. President : F. A. R. Johnstone, M.L.A. Secretary : Wm. Beardall, Newcastle.

LADYSMITH, Friday, 5th July.—All entries close 30th June. President : Herman Illing. Secretary : E. Scott, Box 90, Ladysmith.

UMZINTO, Thursday, 11th July.—All entries close 9th July. President : W. Thomson. Secretary : George Lamb, Umzinto.

DURBAN, 18th, 19th and 20th July.—President : W. R. Poynton. Secretary : Frank J. Volak, New Germany.

RICHMOND, Thursday, 25th July.—All entries close 12th July. President : John Marwick. Hon. Secretary : T. McCrystal, Box 32 Richmond.

DATES NOT FIXED.

GREYTOWN (Date not fixed).—President : Major T. Menne. Secretary : W. H. Gibbs, Greytown.

MID ILLOVO (Date not fixed).—President : B. B. Evans. Secretary : C. B. Lowe, Mid Illovo.

NEW HANOVER (No Show on account of F. C. F.).—President : R. H. Oellermann. Secretary : W. D. Stewart, New Hanover.

NOODSBERG ROAD (Date not fixed)—President : Fritz. Reiche, J.P. Secretary : Paul Vietzen, P.O. Singletree.

STANGER (Date not fixed).—President . F. Addison. Secretary : H. C. Smith.

OTHER SHOWS.

PIETERMARITZBURG HORTICULTURAL SOCIETY, 17th October.—President : T. R. Sim, F.L.S. Hon. Secretary : S. Colman, Deeds Office, Maritzburg.

It is well known that many seeds are provided with wings for the purpose of securing their distribution by the wind. The mahogany affords a good example of such winged seeds. An examination of these shows that there are often provisions for securing that the seeds shall be blown as far as possible from the parent tree. It may not have been noticed that the mahogany seed, as it descends from the opened capsule, rotates rapidly. It thus forms what may be termed a vegetable aeroplane, the rotation evidently serving to retard to a considerable extent the rapidity of its descent. On examination the wing is seen to be curved like the blade of a screw propeller. The retardation is the same as that which would be experienced if a sailing ship, with auxiliary steam power, were to use her sails alone, without unshipping or feathering her screw. In a wind this vegetable gliding plane would be blown further from the tree, when a gust had dislodged it from the capsule, than if it merely had a flat wing. Another tree, *Triplaris*, to be seen in some of the West Indian Botanic Stations, has three bent wings, forming a more perfect screw propeller to keep it flying in the air as long as possible.

Executives of Farmers' Associations.

ALFRED COUNTY FARMERS' ASSOCIATION.—President: A. G. Prentice, J.P. Vice-Presidents: C. Knox, J.P., L. T. Trenor. Committee: C. M. Etheridge, E. J. Gray, W. B. Rethman, H. W. F. Rethman, C. A. Howell, R. E H. Fann, J.P., W. T. J. Gold, Dr. Case, Revd. S. Aitchison. Hon. Treasurer: H. C. Hitchins. Secretary: T. Tribe.

BOSTON FARMERS' ASSOCIATION.—President: Thomas Fleming. Vice-President: J. Geldert. Hon. Secretary and Treasurer, W. J. Fly.

CAMPERDOWN AGRICULTURAL SOCIETY.—President: John Moon, C.O.; Vice-Presidents: A. N. Kirkman, J.P., and G. Swales; Hon. Secretary: — Wilson.

CAMPERDOWN AND DISTRICT FARMERS' ASSOCIATION.—President: John Moon. Vice-President: F. N. Meyer. Hon. Sec.: L. Baker.

DUNDEE AGRICULTURAL SOCIETY.—President: F. Turton, Esq., J.P. Vice-Presidents: The Minister of Agriculture, the Mayor of Dundee, Messrs. A. L. Jansen, H. Ryley, and W. Craighead Smith, J.P. Hon. Secretary and Treasurer: J. McKenzie. Committee: D. C. Pieters, D. Macphail, W. H. Tatham, H. Baasch, M. Taylor, J. A. Landman, N. F. Hesom, A. W. Smallie, C. W. Whysall, W. Craig, C. G. Willson, T. P. Smith, J. Campbell, J. B. Duboisee, W. R. Quested, A. Grice, D. Meumann, W. J. H. Muller, J. E. Caldwell, E. C. Saville, C. M. Meyer, A. J. Oldacre.

DURBAN COUNTY FARMERS' ASSOCIATION.—Patron: J. H. Colenbrander. President: J. McIntosh. Vice-Presidents: H. Westermeyer, R. R. McDonald. Committee: F. R. W. Bœhmer, G. Compton, H. Freese, W. Freese, W. Gillitt, H. W. Kœnigkræmer, H. W. Nichols, F. Schæfermann. Hon. Sec. and Treasurer: Frank J. Volek.

GOURTON FARMERS' ASSOCIATION.—President: W. C. Stockil, Esq., J.P. Vice-President: M. Sandison, Esq. Hon. Secretary and Treasurer: Frederick B. Burnard, Esq.

HATTING SPRUIT FARMERS' ASSOCIATION.—President: Wm. Craig. Vice-President, J. Campbell; Committee: J. J. S. Maritz, G. De Waal, H. J Hearn, Thos. Brookes, N. Glutz, H. Glutz, W. A. Quested, J. A. Brookes, W. J. Hislop, Thos. Dewar, J. Humphries, W. H. Tatham, A. E. Norman, D. W. H. Tandy; Hon. Secretary and Treasurer: R. J. Hearn.

HIMEVILLE AGRICULTURAL SOCIETY.—President: Henry C. Gold, Dartford, Polela. Vice-Presidents: W. Little, R. Justice, G. Malcolm. Executive Committee: G. Malcolm, W. S. Johnston, P. McKenzie, W. Little, G. Royston. Hon. Secretary and Treasurer: Thos. E. Marriott, Brookdale, Polela. Assistant Secretary: F. W. Fell, Ericksburg, Polela.

HOWICK FARMERS' ASSOCIATION.—Chairman, Thos. Morton; Vice-Chairman, M. A. Sutton; Hon. Secretary and Treasurer, A Clark.

INGOGO FARMERS ASSOCIATION.—President: Angus Wood, J.P. Vice-Presidents: G. A. Fimstone and J. Browning. Hon. Secretary and Treasurer: C. Watt.

IXOPO AGRICULTURAL SOCIETY. — President: W. Arnott. Vice-Presidents: F. L. Thring, J.P., John Anderson, C. E. Hancock, J.P. Committee: W. K. Anderson, J.P., Thos Allen, J. C. Auld, H. D. Archibald, F. S. Beningfield, S. Boyd, F. E. Foxon, R.M., Wm. Foster, Jas. T. Foster, Geo. E. Francis, L. Gray, A. M. Greer, J.P., J. R. Greer, Wm. Gold, Jno. Gold, H. A. Hill, C. F. Harriss, A. E. Keith, R. Kennedy, Geo. Martin, W. Oakes, L. J. Phipps, T. F. Remfry, J. W. Robinson, Jas. Schofield, M.L.A., A. Stone, W. R. Way, G. C. Way, A. H. Walker, M.L.A, J. L. Webb (F.R.C.V.S.). Hon. Sec: R. Vause. Hon. Ass. Sec.: C. K. D. Beales. Hon. Treasurer: T. Arnott.

IXOPO FARMERS' ASSOCIATION.—President: A. E. L. Keith, Ixopo. Vice-Presidents: Geo. Martin, Claybrooke, Ixopo; A. Kirkman, Lufafa, Ixopo. Hon. Secretary and Treasurer: Geo. E. Francis, Morningview Ixopo. Delegates to Farmers' Union: President and James Foster. Committee: F. Remfry, R. Vause, C. E. Hancock, John Anderson, R. Greer, W. Oakes, D. Campbell, G. C. Way, James Foster.

KLIP RIVER AGRICULTURAL SOCIETY.—President: Herman Illing; Vice-Presidents: J. T. Francis, J. G. Bester, W. Pepworth. Auditor: J. T. Francis, Esq. Secretary: E. Scott, F.I.A. (Lond.). Executive Committee: A. Brink, D.

Bester. J. Farquhar, C.M.G., W. C. Hattingh, J. G. Hyde, Trev. Hyde, A. L. Horsley, W. Freer, L. A. Leonard, H. Nicholson, J. H. Newton, J. T. Sandalls, W. H. Roberts, H. C. Thornhill.

LION'S RIVER DIVISION AGRICULTURAL SOCIETY.—President: Graham Hutchinson; Vice-President: H. Nisbet; Executive Committee: H. Nisbet, M. A. Sutton, A. J. Holmes, J. Humphries, Jno. Pole, and W. A. Lawton; Auditor: W. J. R. Harvard; Hon. Sec. and Treasurer: Arthur F. Dicks, P.O. Box 1, Howick.

LOWER TUGELA DIVISION ASSOCIATION.—President: T. G. Colnebrander. Vice-President: Lieut.-Col. F. Addison. Hon. Secretary and Treasurer: H. Curtis Smith. Committee: A. S. L. Hulett, A. E. Foss, G. Stewart, J. B. Hulett.

MID-ILLOVO FARMERS' CLUB.—Chairman: L. G. Wingfield-Stratford, J.P. Vice-Chairman: B. B. Evans. Hon. Secretary: J. W. V. Montgomery. Assistant Hon. Secretary: R. Norris Jones. Hon. Treasurer: Jos. McCullough.

MOOI RIVER FARMERS' ASSOCIATION.—President: C. B. Lloyd; Vice-President:—R. Garland; Hon. Treasurer: H. A. Rohde; Collector: Capt. W. H. Stevenson; Auditor: Claude Scott; Hon. Secretary: E. Cautherley.

MUDEN AGRICULTURAL ASSOCIATION.—President: Thos. Thresh. Vice-Presidents: Wm. Lilje, E. A. Grantham. Secretary and Treasurer, C. A. Selling. Committee: Otto Rottcher, Karl Lilje, Karl Rotter, Herman Schafer, Fritz Torlage, T. Braithwaite, Ernest Rottcher, C. H. Tilbrook, Rev. H. Rottcher (Hon. Life Member).

NEWCASTLE.—President: F. A. R. Johnstone, J.P. Vice-President: C. Earl, J.P., Mayor of Newcastle; Angus Wood, J.P., Ingogo; O. Schwikkard, C.M.G., Newcastle. Secretary: Wm. Beardall. Treasurer: Ed. Nicols. Executive Committee: L. H. S. Jones, E. Phillips, H. C. Caldecott, C. Watson, G. Langley, W. A. Lang, W. J. P. Adendorff, J. E. de Wet, O. Davis, S. W. Reynolds, B. Pettigrew, G. W. Thomas, G. H. Bishop, H. R. Muir, M. C. Adendorff, W. Napier, P. Van Breda, Chriss Botha, G. Templer.

NEW HANOVER AGRICULTURAL ASSOCIATION.—President: R. H. Oellermann. Vice-Presidents: J. C. Watt, J.P., and J. A. Westbrook. Life Member: C. A. S. Yonge, M.L.A. Secretary and Treasurer: W. D. Stewart, New Hanover. Auditor: J. H. F. Hohls. Committee: W. N. Angus, E. Bentley, W. W. Bentley, Edward Boast, H. W. Boast, E. E. Comins, G. R. Comins, C. Crookes, jun., G. Demont, H. Dinklemann, J. Duval, W. Fortmann, Dr. C. H. Herbert, J. Hillermann J. H. F. Hohls, H. Jacobson, H. A. Light, G. C. Mackenzie, A. F. Mackenzie, T. M. Mackenzie, J. Muirhead, J.P., G. Moe, J. Moe, O. Moe, C. Oellermann, F. Oellermann, R. H. Oellermann, J. C. Otto, H. Oellermann, E. Peckham, J.P., J. A. Potterill, S. Peckham, C M. Scott, Rev. J. Scott, Wm. Schroder, J.P., Owen Solomon, J. H. Smith, Riby Smith, H. Thöle, F. Thöle, H. Vorwerk, H. F. Westbrook, W. H. Westbrook, C. Westbrook, T. Wolhuter.

NOODSBERG ROAD AGRICULTURAL ASSOCIATION.—President: Fritz Reiche, J.P.; Vice-Presidents: H. Mummbrauer, P. Rodehorst, W. Dralle, W. Wortmann; Committee: W. Bartels, F. Bosse, H. Brammer, A. J. Bruyns, H. Bruyns, Carl Dralle, H. Gebers. W. Gevers, J. H. Holley, jr, W. C. Holley, C. Hillermann, L. Koch, H. Köhler, F. E. Kuhn, M. Maister, H. Mereis, A. Meyer, H. Meyer-Estorf, H. W. Meyer, K. A. Meyer, H. Misselhorn, W. Misselhorn, K. Peters, I. Pfotenhauer, G. Rabe, G. Reiche, Joh. Reiche, W. Rencken, H. Rosenbrock, H. Schmidt, K. Schmidt, Rev. Jas. Scott, K. Seele F. J. Smith, J. Thies, W. Witthöft, P. Worthmann, A. Wortmann, F. Wortmann, H. Wortmann; Secretary: Paul Vietzen, P.O., Singletree; Hon. Treasurer: E. Beurlen.

NOTTINGHAM ROAD FARMERS' ASSOCIATION.—President: W. Henwood, J.P., Vice-President: B. Greene; Auditor: A. Mengens; Secretary and Treasurer: C. J. King, Nottingham Road.

RICHMOND AGRICULTURAL SOCIETY — President: John Marwick. Vice-Presidents: W. P. Payn, A. W. Cooper, J. W. McKenzie and Chas. Nicholson. Honorary Treasurer: R. Nicholson. Hon. Secretary: Tom M'Crystal. Committee: J. W. T. Marwick, Evan Harries, R. A. McKenzie, F. O. Howes, H. M. Moyes, W. Comrie, Thos. Marwick, J. C. Nicholson, J. W. Flett and E. J. B. Hosking.

ROYAL AGRICULTURAL SOCIETY OF NATAL.—President: Sir G. M. Sutton, K.C.M.G. Vice-Presidents: His Worship the Mayor, Messrs. Jas. King, O. Hosking, D. C. Dick, Col. E M. Greene and P. D. Simmons. Executive: Sir G. M. Sutton, President; Messrs. Jas. King, O. Hosking, D. C. Dick, Col. E. M Greene and P. D. Simmons, Vice-Presidents; Committee: G. J. Macfarlane, W. S. Crart, W. H. Cobley, H. J. Stirton, W. J. O'Brien, L. Line and Sir T. K. Murray. Yard Superintendent: H. J. Stirton. Secretaries, Treasurers and Collectors: Duff, Eadie & Co., 12, Timber Street, Pietermaritzburg. Auditor: G. V. Lambert.

SLANG RIVER (UTRECHT) FARMERS' ASSOCIATION.—Chairman, P. J. Kemp; Executive Committee: J. J. Uys, J. Z. Moolman, T. J. Botha, P. J. Viljoen, P. J. Kemp; Hon. Sec. and Treasurer, Thys Uys, Utrecht P.O.

UMVOTI AGRICULTURAL SOCIETY.—President: Major T. Menne. Vice-Presidents: Theunis J. Nel, M.L.A., W. J. Slatter, W. L'Estrange. Executive Committee: Tol Nel, A. Newmarch, W. Lilje, O. Rottcher, S C. Van Rooyen, W. Newmarch, E. J. Van Rooyen, O. Norton, I. M. Nel, J. Browning. Managers of Show Yard: J. M. Handley and N. Hunter. Hon. Auditor: W. K. Ente. Secretary and Treasurer: W. H. Gibbs.

UPPER BIGGARSBERG FARMERS' ASSOCIATION.—President: George Langley; Vice-President: W. L. Oldacre; Secretary: J. H. Murray.

UTRECHT AGRICULTURAL SOCIETY.—Chairman: L. Viljoen; Vice-Chairman: B. H. Breytenbach; Members: I. Bierman, M. M. Knight, J. H. Klopper, B. C. Hattingh, T. Botha, M. Gregory, P. L. Uys, H. P. Breytenbach, Secretary: G. J. Shawe.

VICTORIA COUNTY AGRICULTURAL SOCIETY.—President: Lieut.-Colonel F. Addison; Vice-Presidents: Sir Liege Hulett, Kt., M.L.A., W. J. Thompson, Esq., J.P., J. Polkinghorne, Esq., M.L.A.; Committee: Messrs. W. H. B. Addison, G. S. Armstrong, M.L.A., C. Bishop, J.P., D. Brown, sen., J.P., W. Campbell, T. G. Colenbrander, A. E. Foss, J.P., A. S. L. Hulett, J.P., J. B. Hulett, C. Jackson, G. Nicholson, J.P., T. Polkinghorne, J. W. Perkins, J.P., E. Saunders, J.P., G. Stewart, and J. H. Stansell; Hon. Secretary and Treasurer: H. Curtis Smith (Stanger)

WEENEN AGRICULTURAL SOCIETY.—President: A. F. Henderson, Esq., C.M.G.; Vice-Presidents: J. Button, J.P., Jas. Ralfe, J.P., H. Blaker, J.P., E. B. Griffin, J P.; Hon. Treasurer: F. C. Schiever; Auditor: S. Wolff; Executive, Hon. H. D. Winter, R. H. Ralfe, J. W. Moor, D W. Mackay and Allan Stuart; Manager of Show Yard: S. Vaughan; Assistant: A. Clouston; Hon. Secretary: E; Cautherley.

WEENEN COUNTY HORTICULTURAL SOCIETY.—Committee of Management: A. F. Henderson, C.M.G., F. C. Schiever, G. W. Linfoot, P. J. Nunn, Dr. Brewitt, S. Vaughan; Hon. Secretary: E. Cautherley.

ZULULAND COAST FARMERS' ASSOCIATION. — President: G. H. Hulett; Vice-President: C. Hill; Hon. Secretary and Treasurer: F. Brammage Ginginhlovu.

(The Editor will be obliged if the Hon. Secretaries will supply him with lists of the Executives of their Associations.)

Central Experiment Farm, Cedara.

In order to minimise interference with the general course of work on the Central Experiment Farm, Cedara, it has been found necessary to set apart two days of the week, namely, Tuesdays and Fridays, as visitors' days.

Arrangements will accordingly be made on those days for receiving visitors and showing them round the Farm. A trap will be at Cedara Station to meet the up 9.50 a.m. train; and if intending visitors from up-country will give notice to the guard at Howick Station, on their way down, a trap will be sent to meet the train which passes through Cedara at 11.2 a.m. Visitors travelling by other trains will also be met if they will previously make arrangements by writing.

On other than visitors' days visitors may be received by appointment, but special attention cannot be guaranteed in regard to their being shown round.

At least fourteen days' clear notice must be given by associations so that there may be time to make all necessary arrangements.

W. F. CLAYTON,
Minister of Agriculture.

Diamond Drilling.

Some of the departmental diamond drilling plants are at present disengaged an available for hire for boring for either minerals or water. Particulars as to term of hire may be obtained from the undersigned.

CHAS. J. GRAY,
Commissioner of Mines.

Model Rules for Agricultural Co-Operative Societies.

The Department of Agriculture has for disposal, at the rate of one shilling each copies of Model Rules for the use of Agricultural Co-operative Societies. Applications should be made to the Secretary, Minister of Agriculture, Pietermaritzburg.

Employment Bureau.

The Department of Agriculture has received applications from the undermentioned, who are prepared to become assistants or apprentices on farms. The Department will be glad to hear from farmers willing to take young men as assistants, and to place them in correspondence with the various applicants. When communicating on the subject, farmers may refer to the applicants by quoting the numbers in the following list:—

No. 90.—22 years of age, active and not afraid of work, desires situation on farm where he can acquire knowledge of farming, small remuneration with board and lodging required.

No. 91a.—Scotchman, 40 years of age, single, who has had lifelong experience of stock and agricultural farming in Scotland. Has been three years in South Africa. Produces good references. Is of respectable and intelligent appearance. Seeks managership or assistant managership of farm, if possible. Salary not of first importance.

No. 92a.—Englishman, 50 years of age, with varied experience in tea and coffee planting in Ceylon, and also of contract work. Has also been on a Sugar Estate, and has had experience in pig rearing. Salary needed.

No. 93.—Young lady, 20 years of age, trained at the Reading Agricultural College and holding certificates for Poultry and Dairying, desires situation on a farm. Is prepared to take entire charge of poultry and dairy and, if required, would accept payment on results. Stated to be keen worker and thoroughly practical.

No. 94.—Scotchman, who has lived all his life in South Africa, desires employment on farm in connection with stock if possible. Was a Head Conductor during Boer War. Was 2 years with Transvaal P.W.D. as handyman. Produces good references. Desires salary.

No. 95.—German, of respectable appearance, who speaks English fluently, desires employment on a farm. Is 48 years of age, and has been accustomed to farm work, wire fencing, masonry, carpentry, &c. Salary required.

No. 26F.—Farmer in Dundee District desires to secure services of young man anxious to acquire practical knowledge of farming. £2 per mensem offered, in addition to board and lodging.

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Package and postage of seed, when required, charged 1s. per lb. extra.

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3.—" Insects in an Important Rôle," by Claude Fuller. [1904]. *(Out of Print).*
4.—" Manures on the Natal Market, 1903," by A. Pardy. [1903].
5.—" Weed Circular," by Claude Fuller. [1905].
6.—" Manures on the Natal Market, 1904," by A. Pardy. [1904].
7.—" Tree-planting in Natal," by T. R. Sim. [1905]. *(Price 2s. 6d.)*
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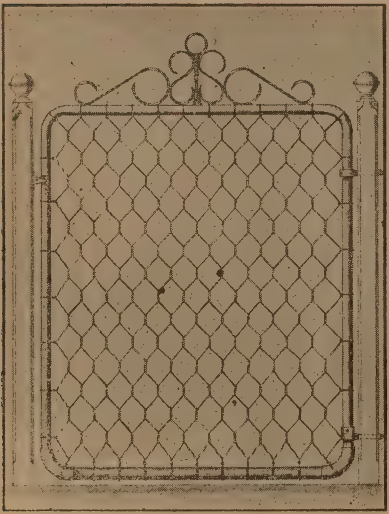

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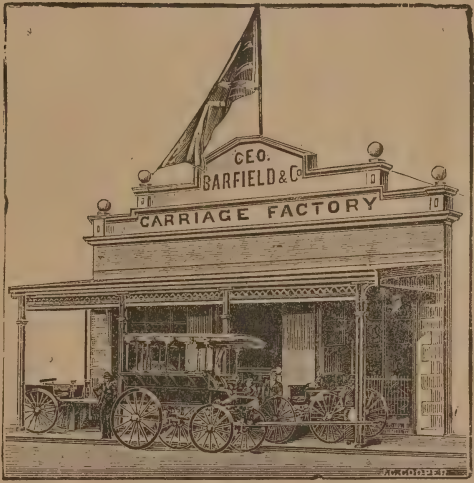

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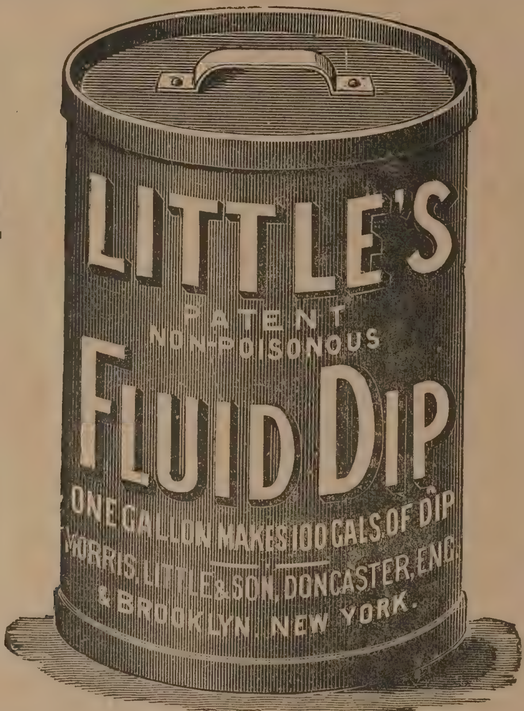
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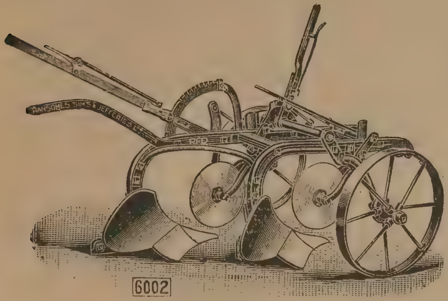

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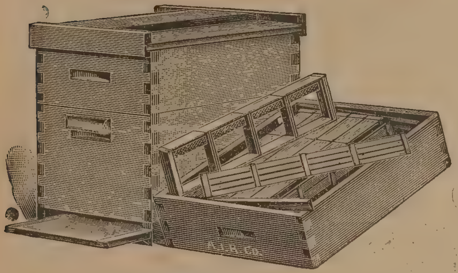

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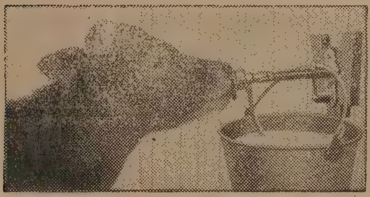

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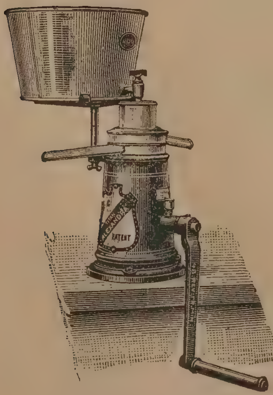

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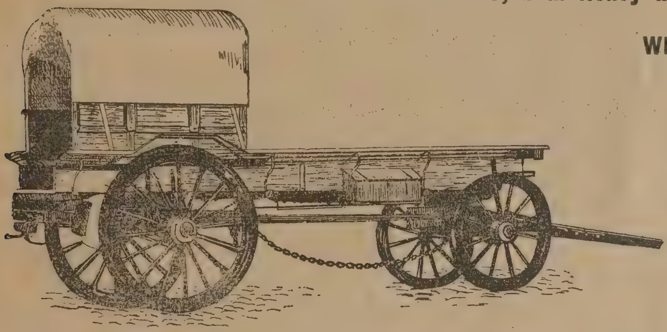

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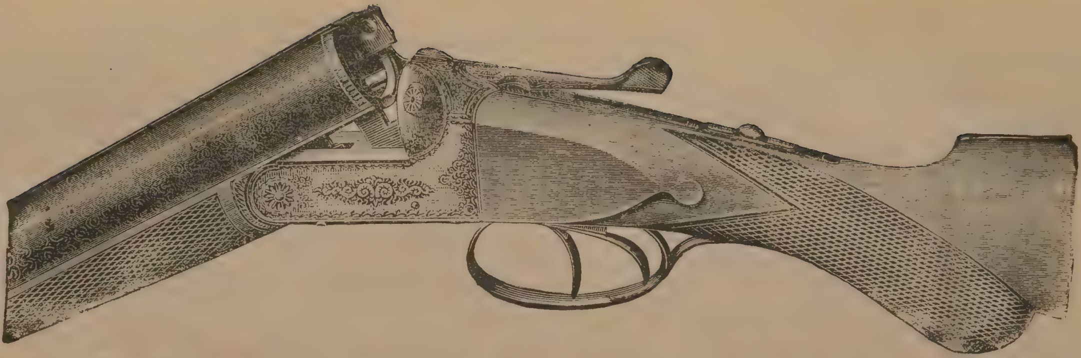

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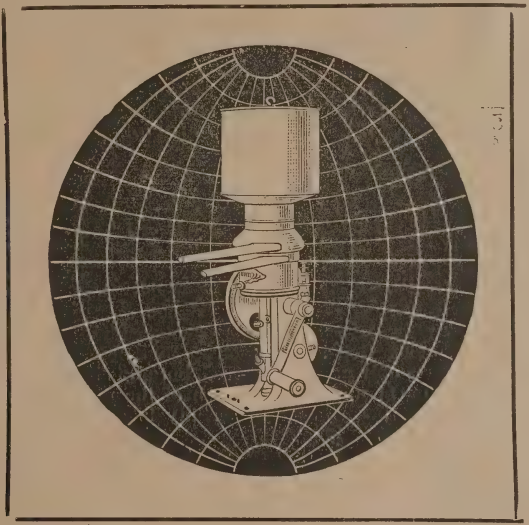

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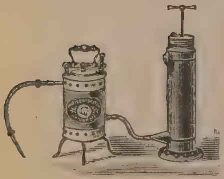

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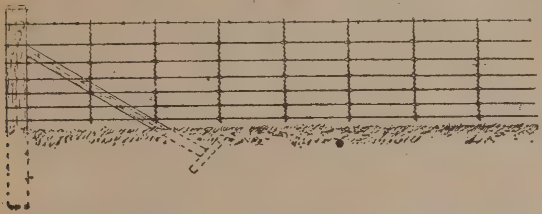

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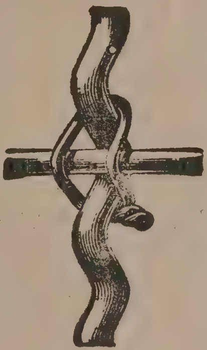

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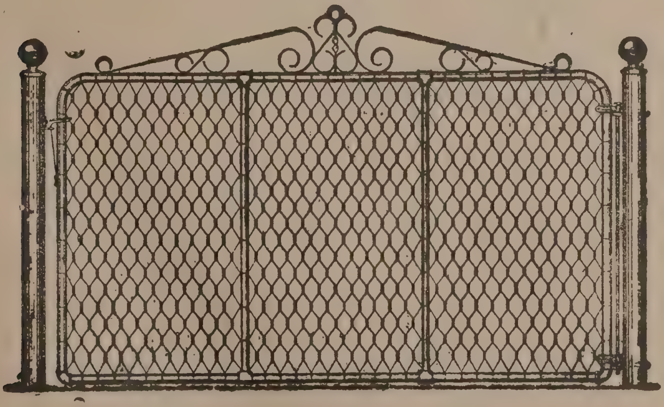

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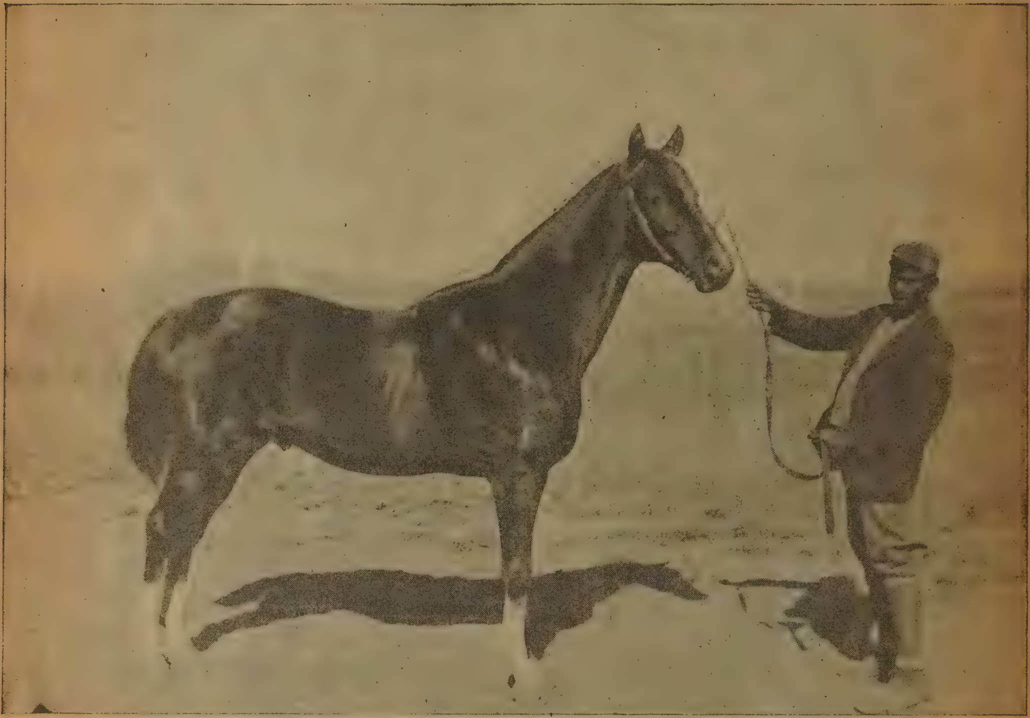

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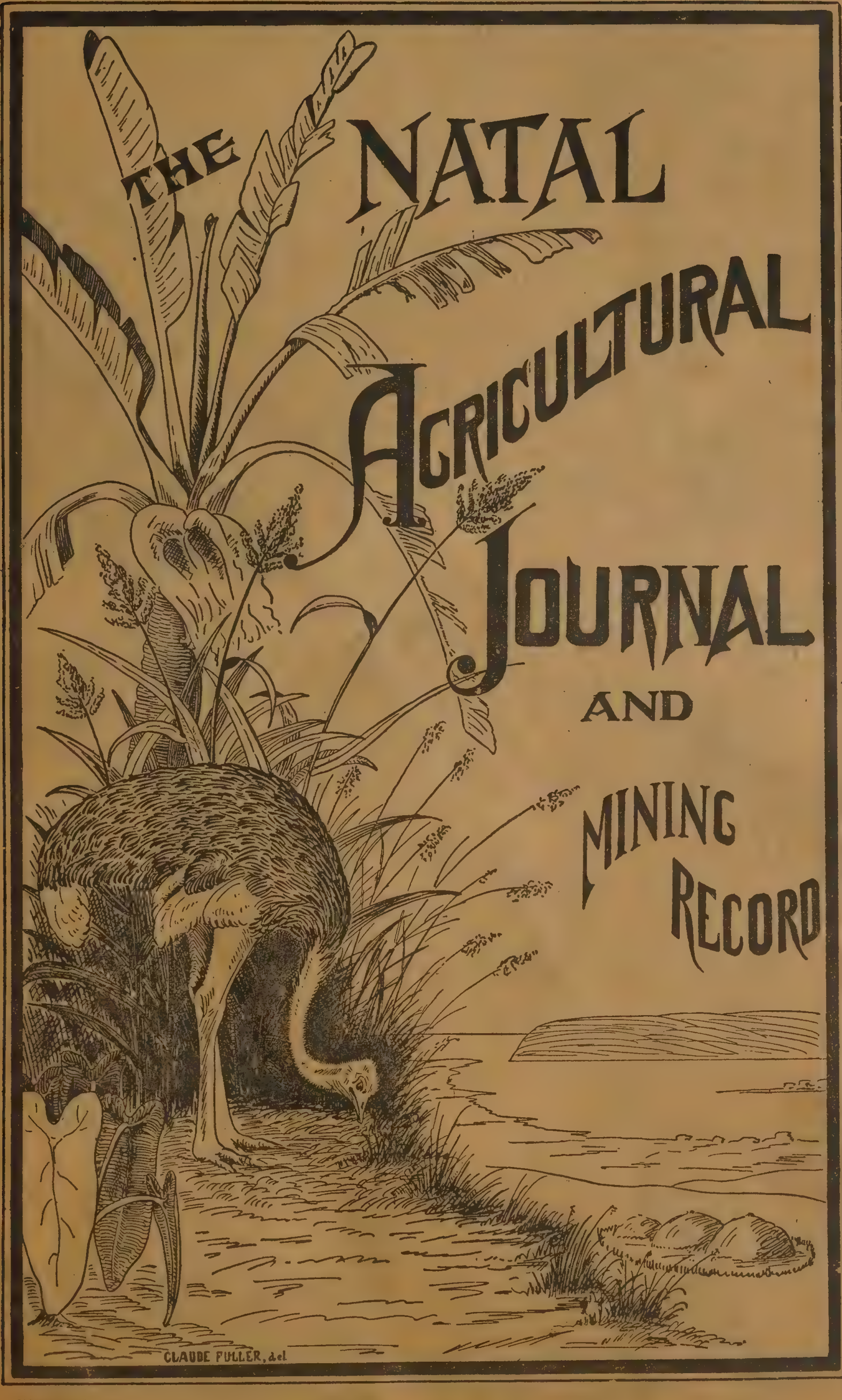

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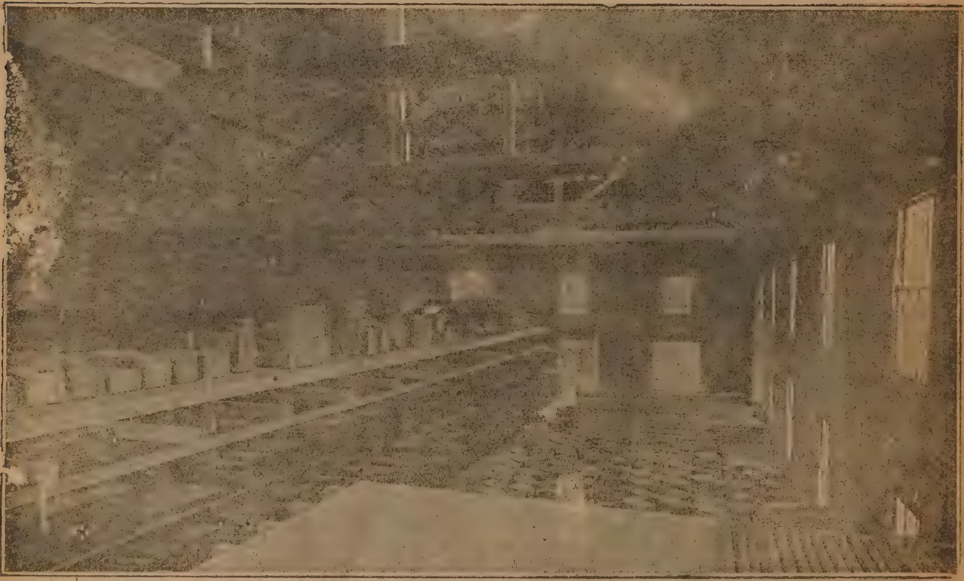

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Vol. X., No. 4. *APRIL 26, 1907.*

. . THE . .

NATAL AGRICULTURAL JOURNAL

AND

MINING RECORD.

Published for the Department of Agriculture

Publishers:
THE "TIMES" PRINTING AND PUBLISHING COMPANY, LIMITED.

1907.

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"Ottawa."—Mr. Gilbert Wilkinson, J.P.

(See article "A New Industry," by "Ergates.")

VOL. X. No. 4. APRIL 26, 1907.

Natal Agricultural Journal and Mining Record.

The Fibre Industry.

By J. MEDLEY WOOD.

As considerable interest is now at last being taken in this industry, it may be as well to give some account of the plants which are cultivated for the extraction of their fibre, as there seems to be some amount of ignorance on the matter.

The plants which are best suited for this purpose, and most generally cultivated, are *Fourcroya gigantea* (Vent)—the fibre from which is commonly known as "Mauritius Hemp"—and *Agave rigida* (Miller), the variety *sisalana* which yields "Sisal Hemp." These plants are commonly known as Aloes, but they both belong to a different Order: *Fourcroya,* or more properly *Furcraea* and Agave to *Amaryllideae,* Aloe to *Liliaceae.* None of our indigenous Aloes are of any value as fibre-yielding plants. The plant which is most common in Natal is *Furcraea gigantea.* Another species, *Furcraea cubensis,* has been, and perhaps still is, cultivated in Mauritius, but it is inferior to *F. gigantea,* and is distinguished from it by its not producing a trunk, or only a very short one. This species I have not seen in Natal. Another closely related plant which is not uncommon in Natal is *Agave americana,* popularly known as "American Aloe," or "Century plant." This is frequently mistaken for *Furcraea,* but may at once be distinguished from it by the thickness and weight of the leaves. These leaves also contain a large percentage of strong fibre, but their great weight renders the plant quite unsuitable for cultivation commercially. Of the two first-named plants, *Agave rigida* is undoubtedly the best for cultivation, but unfortunately plants cannot be obtained in sufficient quantity in Natal at present. About 17 years ago we received from the Director of the Royal Gardens at

Kew 20 plants of this species by parcels post, all, or nearly all, of which were reared. Some time afterwards we received from the same institution a box containing a large number of plants, the whole of which were dead on arrival. The plants first received, or their progeny, are still here, but until now there has been no demand for them, and many thousands of the young plants—or bulbils, as they are called—have been consigned to the manure heap. We are now propagating them as fast as possible, and a large number have already been sent out. We also supplied to the Conservator of Forests a quantity of leaves, which were put through the mill at Umzimkulu. The fibre was forwarded to the Exhibition in London, and will no doubt be reported on in due course. Under these circumstances, the planters will for the present have to plant the *Furcraea* until seeds can be obtained from the few plants of *A. rigida* they may be able to obtain. At maturity, when they "pole" as it is called, that is bear their flowers and seeds on a long central stalk, each plant will give some hundreds of bulbils, which should be planted in a nursery until large enough for planting out. The "Sisal Hemp" plant may also be propagated from cuttings of the roots, the taking of which does not damage the plants if carefully done. In putting out the plants in the field, whether of *Furcraea* or Agave, the land should first be ploughed and harrowed, and the plants placed in rows—varying in other countries at from 5 to 8 feet apart, with a wider space every fourth or fifth row. It is best not to put out the plants until they are at least 18 inches high. In favourable situations and with good cultivation, cutting the leaves may commence in three to four years after planting, and an annual crop will be yielded for 10 to 15 years or more. This, however, is liable to considerable variation. The average yield per acre per annum is said to be 33 leaves from each plant, and from 50 to 90 lbs. of clean fibre to every 1,000 leaves. The average number of good leaves will depend on the distance between the plants, the nature of the soil, and the attention paid to the crop. The plant has few, if any, enemies, but wind breaks will in some cases be necessary; and severe frost, though it may not kill the plants, will certainly damage the leaves.

The great obstacle to the extended cultivation of these plants has been the want of a machine which would turn out a sufficient quantity of fibre in the day, and be worked at a moderate cost. This difficulty has now, I understand, been removed. As I have not seen the machine, however, I am not in a position to say anything about it, but I hear that it is succeeding well. The market value of the fibre is liable to much fluctuation. In April, 1906, Mexican "Sisal" was quoted at £14 per ton for inferior, and £33 6s. 8d. for good. "Mauritius Hemp," £25 to £32 per ton. For Sisal Hemp the average for the 13 years 1879 to 1891 was £20 14s.; the highest during that period was £50, in 1889; the lowest, £19, in 1885. The present value is from £25 to £35 per ton

In conclusion, I am and have been for many years of the opinion that the cultivation of these plants will pay well, but it must be remembered that it is not likely to succeed for small holdings unless there is a central mill within a reasonable distance. The acreage under cultivation must be numbered by hundreds; small and isolated plantations cannot be recommended.

Notes and Comments.

Estcourt-Weenen Railway.—The new narrow-gauge railway from Estcourt to Weenen was opened at noon on the 17th April by Mr. Hitchins, the Minister of Railways and Harbours.

Fibre Machinery.—In this issue will be found illustrations of types of machinery used for the extraction of fibre—*Agave* and ramie. These machines were referred to by Mr. C. Rositzky in his article on fibre in the last number of the *Journal*, but it was not possible to insert illustrations of them in the same issue.

Natal Pines in London.—In a further communication to the Minister of Agriculture, the Agent-General remarks, regarding the consignments of pineapples sent to the Exhibition in London, that the fruit have had a very good sale up to the time of writing. "I am pleased to say," the Agent-General continues, "that my first advices as to the unsatisfactory condition of the deck pines are not applicable to Messrs. Mackinlay & Co.

Printing the Journal in Dutch.—There seemed considerable misunderstanding when this subject came before the Conference. The Minister of Agriculture made the very generous offer that if he could be assured of at least 200 extra Dutch subscribers to the *Journal*, the Government would favourably consider the printing of the same in Dutch. Many of those present reckoned the value of the 200 subscribers (at 5s. each), and jumped to the conclusion that the cost of printing the *Journal* in Dutch would only be £50. One of the delegates from a Dutch-speaking district offered to himself guarantee the £50. The actual cost, however, of entirely printing this *Journal* would be nearer £1,000 than £50. In the first case, it would take the whole time of an interpreter every month to translate the articles and revise the proofs. A qualified man could scarcely be obtained for less than £300 a year. Again, a fresh contract would have to be entered into for the printing of the *Journal*. In the present contract the value of advertisements has been taken into account, and it is doubtful whether many advertisements would be forthcoming for the Dutch issue, so that the printing would be likely to run into at least £500 a year; so that an estimate of £1,000 a year would not be far out.

A CORRECTION.—Mr. Cesar Rositzky writes asking that certain figures in his article on Fibre Cultivation, appearing in last issue, may be altered. On page 214, the price of the 16-h.p. gas suction engine should be £385, and not £420, as originally shown. The total for that section will thus stand at £670. Again, on the same page, in the next section (plant for 200 acres), the price of the 25-h.p. gas suction engine should be £500, and that of the "shed, etc.," £378, and not £546 and £332 as printed. The total of £2,000 remains unaffected.

FIBRE CULTIVATION.—At the request of the Minister, Mr. J. Medley Wood has very kindly supplied a short article for this issue on the *Fourcroya gigantea* and *Agave rigida* fibres, based on the experience he has had of the same in Natal. There is also published in this issue a summary of an article on fibre cultivation by Mr. H. T. Edwards, the Fibre Expert of the United States Department of the Interior Bureau of Agriculture, Manila. Although Mr. Edwards' article does not deal with *Fourcroya gigantea,* yet his observations and recommendations are equally applicable to our own fibre plants, so that the reproduction of his article should prove of especial value to Natal farmers seeking information regarding fibre cultivation.

MOISTURE IN MEALIES.—In a bulletin recently issued by the U.S. Bureau of Plant Industry, reference is made to the deterioration of maize during transit from America, or whilst in storage, and the consequent bad effect upon the European market. The principal cause of this deterioration, it is stated, is an excessive moisture content. "Corn as it is harvested in the autumn ordinarily contains from 20 per cent. to 35 per cent. of water, depending on the season and the relative time of harvesting. Much of the corn as it comes from the fields goes directly into the small elevators throughout the corn-growing States, to be transferred later to the large elevators or storage bins at the grain centres. Owing to the cold weather usually prevalent at this season of the year, corn may be stored or exported without much danger of deterioration, even though the water content is relatively high, but with a slight rise in temperature it will begin to sweat, after which fermentation soon sets in, resulting in mouldy and damaged grain."

It has been stated that Natal mealies will be recognised on the English markets as a superior article to the American, such superiority being due to the fact that Natal mealies are sun-dried. This ensures the thorough elimination of all moisture. In their own interests, however, intending exporters must give every attention to the proper drying of their mealies before bagging. It is easy to spoil a reputation, but very difficult to re-build one; and any mealies showing signs of moisture on arrival at the port will not be allowed to be forwarded under the Government scheme of exportation.

Hailstorm Insurance.—This subject was placed on the agenda of the Natal Agricultural Union, and enquiries have also recently been received from individuals regarding the feasibilty of such a form of insurance. Full information on the subject was published in the *Journal* last October. The position in brief is that there are no reliable statistics available regarding the frequency of hailstorms and the damage done in Natal, and that no insurance company will undertake the business until the risks are known. Statistics are now being collected by the Department, but they will be of no value for at least five or ten years. The only practicable scheme appears to be to form a co-operative insurance association, each person paying in proportion to the value of his crops. At the end of each season payment could be made out of the funds in hand in proportion to the damage done by hail and in proportion to the funds in hand—the fund itself never being absolutely exhausted. A guarantee to pay any definite proportion of damage done would probably render the association bankrupt the first season.

The Julie Mango.—The *Bulletin* of the Trinidad Botanical Department for January, 1907, contains the following concerning the "Julie" mango:—"The mango known as the 'Julie' is one of the best, or perhaps the very best, of all the introduced kinds, and is daily gaining in favour, the demand for plants at the Government Experiment Station being larger than for any other kind. Among the reasons for this preference are: (1) Its excellent flavour; (2) keeping qualities; (3) suitability for transport; (4) early bearing; and (5) its ability to produce regular annual crops. Its flavour recommends it to the majority of consumers, and as it has little or no fibre, it is eminently suitable for table use. Probably no mango known keeps good a greater length of time, and its tough skin renders it easy to pack for transit to long distances. It fruits at a very early age, often commencing at four years from planting, and sometimes earlier. The tree has a dwarf, bushy habit, and in time grows to a large size. The 'Julie' is one of the most regular croppers of all the mangos. It has been exported to England from Trinidad, and has arrived in first-class condition. Compared with it, the famous Jamaica No. 11 is 'out in the cold,' as it can be eaten with a spoon, while the No. 11 is characterised by the large amount of fibre which adheres to the seed. It is a long way superior to the 'Peters' or 'Malda,' and is always found in superior condition to that mango, which has the fatal fault of being frequently sour at the centre. Altogether, 'Julie' takes the first place among the cultivated mangos of Trinidad, and the trees suffer less from disease than most other kinds. It is certainly a fruit which can be highly recommended for cultivation for export." The Department of Agriculture is causing enquries to be made with a view to the introduction of this variety of mango into Natal, where it should meet with much favour.

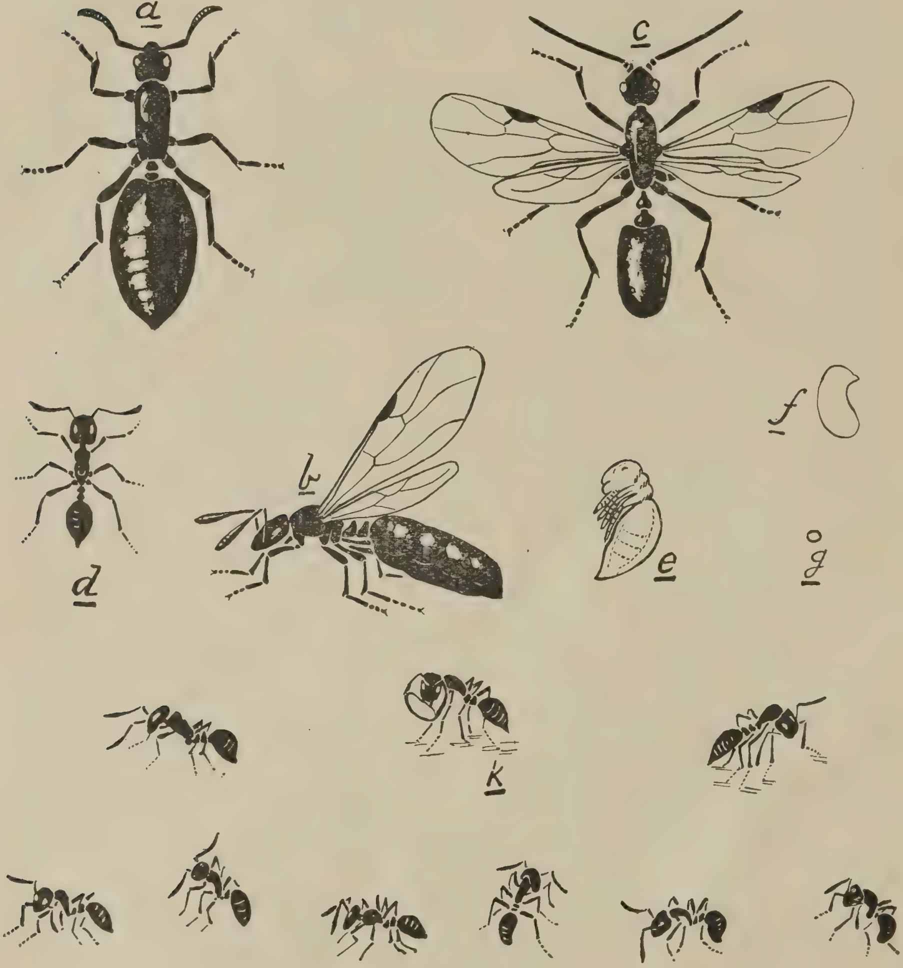
UNIFORM WEIGHTS AND MEASURES.—The Natal Agricultural Union at its last Conference removed the stumbling block in the way of the adoption of a uniform system of dealing with produce. In its previous resolutions the Natal Agricultural Union suggested the adoption of a system of selling all produce by the 100lbs. *inclusive of packages.* Were all packages of uniform weight, this would not have been an obstacle, but considering that potatoes and other produce are sold sometimes in bags or sacks and sometimes in boxes, it is obvious that a system which includes the weight of packages in the deal opens the door to a considerable amount of fraud. In boxes alone the variation in weight is considerable, and, if the produce be of a valuable nature, it is plain that the purchaser buys a wooden box at a rate far above its actual value. It is analogous to the old argument as to whether a grocer, in disposing of a pound of tea or sugar, is entitled to give you a pound weight inclusive of the paper package or whether he is not bound in all fairness to make allowance for the weight of such package, otherwise, if the tea be an expensive one, you buy the paper package at a rate of 2s. 6d. a pound—small when considering the one paper package, but large when regard is had to the total number of packages sold during a month. Legislation will be necessary in all the Colonies to bring about the wish of the Union, but, now that the objection has been removed, there seems no reason why the various Legislatives should not agree to the proposal.

LOCUST PARASITES.—A correspondent a short time ago wrote to the Minister of Agriculture, forwarding a cutting from an English newspaper relative to a certain parasite of the South American locusts, and suggesting the co-operation of the South African Governments with a view to introducing the parasite in question from Argentina to this country. The matter has been referred to Mr. Fuller (Government Entomologist), who states that the presence of these parasites in the South American locusts has been well known to entomologists since the matter was primarily investigated in 1897 by Professor Lawrence Brunner. Their presence had, moreover, been recorded prior to this. Despite the presence of these parasites, the migratory locust is as bad in Argentina as it is in relative sections of South Africa; and, this being the case, there does not appear to be any conspicuous advantage to be derived from the introduction of these parasites. Furthermore, the difficulties to be overcome in transporting the parasites in question to South Africa alive are extremely great; and also, as their host, the South American locust, is a different species from the South African, there is, judging from analogy, every probability that the parasites when here would not attack the local species, but succumb. There are already numerous parasites upon the migratory locust of South Africa at present, and amongst others an almost similar fly. Concerning this, a case came under the notice of the Government Entomologist several seasons back in which these flies destroyed more than 80 per cent. of the locust eggs laid in the district.

FIBRE BROKERS IN LONDON.—The attention of fibre planters is directed to the letter from Messrs. Mackinlay & Co., London, to the Director, Experiment Stations, appearing in our correspondence pages. Those interested will do well to place themselves in communication with subsequent shipments."

EXPORT OF ANGORA GOATS FROM O.R.C.—The *O.R.C. Government Gazette* of the 8th April contains the promulgation of an Ordinance "to impose a duty on the export of Angora rams and ewes." This Ordinance provides that a duty of £100 shall be imposed upon every Angora ram or ewe exported from the O.R.C., except in the case of animals exported to such other Colonies or territories of South Africa as have in force a similar statute. The position now is that all the Colonies of South Africa, together with the Portuguese Territory, have similar legislation on this subject.

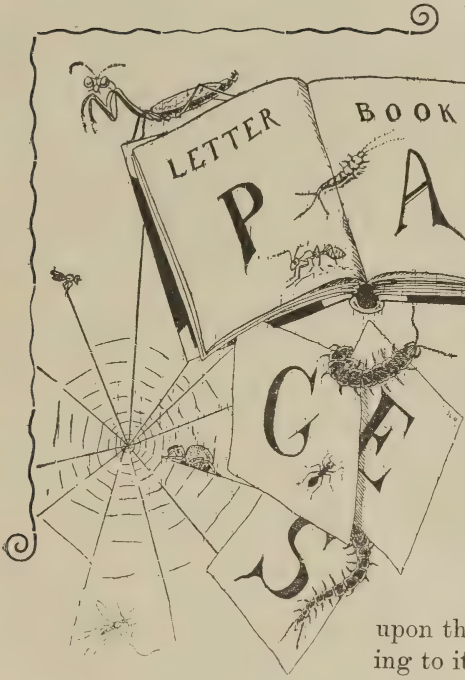
INSECT-CATCHING PLANTS.—Readers of this *Journal* may possibly have heard of insect-catching plants, such as the English Sundew, a plant found in marshy places, which catches and devours insects by means of a gummy substance which holds them fast, and the Venus' fly-trap and the pitcher plant. The one is a plant which closes up and entraps the insect which alights on it, and the other (as its name implies) is in the form of a pitcher or jug, at the bottom of which is a fluid. When the unfortunate insect visits the pitcher for a drink, it finds a most inviting path leading to the fluid, but when it essays to return, spikes projecting downwards, over which it slipped on its way to seek a drink, prevent its return. The unfortunate insect again and again climbs the pitcher wall, only to find each time its way blocked by the spikes, till ultimately, thoroughly exhausted, it can no more attempt the passage, and meets a lingering death in the watery fluid. Mr. E. F. Ford, of Maritzburg, recently brought under the attention of the Department an insect-catching plant growing at Mooi River. It is a climbing plant growing along a fence, and has small white pitcher-shaped flowers about half an inch in length. These appear to be contractile, and when insects, such as wasps, moths, and beetles visit the flowers for the sake of honey, they contract and hold the insect fast, suffocating it, so that you have the weird spectacle of a large number of white flowers growing on a hedge out of which protruded dead bodies of all manner of insects held fast in its death grip. It does not yet appear clear whether this is an accidental circumstance due to the plant being an imported one, which in its natural clime is fertilised by a very small insect, or whether the catching of the insects serves some economy in the function of the plant, but the matter is being enquired into by the Department, and Mr. Ford is to be thanked for calling our attention to it. It may be a valuable ally where injurious insects abound, though it is evident the flowers will entrap all insects whether injurious or beneficial, so that it might prove a nuisance.



HOUSE ANTS.

a. Female Ant, magnified 36 times.
b. The same before shedding its wings.
c. Male Ant, magnified 36 times.
d. Worker Ant, magnified 49 times.
e. Pupa Ant, magnified 25 times, without cocoon.
f. Grub or Larva Ant, magnified 25 times.
g. Egg of Ant, much magnified.
k. Worker Ant carrying cocoon in its jaws; enlarged.
Remainder, Working Ants in various attitudes.

House Ants.



Highflats, via Ixopo,
4th March, 1907.

Dear Sir,—

In the October number of the *Agricultural Journal* is an article about the destruction of ants. Can you tell me what was the exterminator used, where it may be obtained, and what is the *modus operandi*? I may say that the ant which is among us is the small red one, and it is all through the house, outbuildings, dairy, storerooms, etc. One cannot put a piece of bread or fruit upon the table without the ants swarming to it during the night.

Thanking you in anticipation,
Yours faithfully,
WM. GRAY.

Office of the Government Entomologist,
Pietermaritzburg, 10th March, 1907.

Dear Sir,—In reply to your letter of the 4th instant. There are a number of ants which invade the larder and other parts of the house in search of provender, but of these the small red species is the commonest and most troublesome.

LIFE HISTORY.

It is always well, in dealing with any insect pest, to have some knowledge of its life history and habits in general. The most conspicuous feature of the ants—which, by the way, are near relatives of the bees and wasps, and bear no relation whatever to the termites, or white ants—is their social instinct, which is evidenced by their living in colonies and inhabiting nests, each individual working, not for himself, but for the common weal of the community. In writing on this interesting phase of their nature, Comstock says: "If the statesman or the philosopher would study a perfect communistic society, let him throw away his histories of poor human attempts, and go and study thoroughly the nearest ant-hill. There he will find no love for friend or wife or child, but a love for everyone. There everything is done for the good of the whole, and nothing for the individual. The state makes wars, provides food for all, cares for the children, own all the property. He will find no complaint against the existing condition of society, no rebels; but the fate of each one is determined by the accident of birth, and each takes up his work without a murmur. He will find that this perfect commune has developed courage, patriotism, loyalty, and never failing industry; but he will find also that war, pillage, slavery, and an utter disregard of the rights of other communities and individuals are as prevalent as they are among our own nations, where selfish private ambition has held sway so long."

The colonies of each species of ant include at least three kinds of individuals, as do those of the social wasps and bees, and may include several more. There are always the winged males, which die soon after the nuptial flight, and the winged females, which, after this ceremony, immediately set about the establishment of a new colony. The third form is the worker, or wingless and infertile female, and corresponds with the working class among the bees. They are sometimes erroneously called "neuters."

In some species, however, as many as eight forms have been found in the one nest. For instance, the workers are generally in two sizes; these are known as worker minors and worker majors. In addition to these there are workers who, provided with extra large heads and powerful jaws, are referred to as soldiers. Between this form and the worker, intermediate forms occur, and, lastly, we have the ergatoids (worker-like), wingless, but fertile males and females.

The red ant and most of its kind build their nests either in the walls or beneath the floorings of the house; sometimes they are built in the environs of the dwelling, and may be found at the base of some tree, beneath a convenient boulder, or even on the adjacent lawn or garden walk.

"Often in the warm summer afternoon the air will seem to be filled with countless thousands of flying ants. Their moving wings divide the sun's rays into rainbow flashes, as they rise or fall, a silent onward-moving host. This is the wedding journey of the male and female ants."

The males soon perish, but their mates, on falling to the ground and shedding their wings, have but just begun what may prove to be a long and very busy existence. From the eggs laid by the females there soon hatch the tiny little white larvae which later change to pupae of the same hue; these are often mistaken for eggs, as they are seen carried along by their nurses, the workers. Until this first hatching has reached the adult stage, the young are fed entirely from food regurgitated by the mother. Once able to look after themselves, however, they unselfishly take up the multifarious duties of feeding and nursing, and the work of building and extending the domicile. The queen, from now on, has but to lay her eggs, the subsequent care of these and later, of the larvae and pupae, being left entirely to the workers; and the responsibility is not misplaced. They carry their charges from chamber to chamber, either higher or lower, so that they may enjoy a suitable degree of warmth, and even bring them up to the open air, should the humidity and temperature required make it necessary. When next you observe these little workers, toiling along with some little white objects, do not imagine that these are ants' eggs, as commonly supposed, but understand they are the later stages of the development, and many times the size of the ova.

There is some difference of opinion as to whether the female ant is able, after the nuptial flight, by her own unaided effort, to found a new community. Some aver that, unless she is found and taken care of by worker ants, she speedily dies, as is practically the case with the bees, whilst among others the belief holds good that each of these methods is represented and followed out in the life history of different ant species.

TREATMENT.

The "Exterminator" to which you refer in your letter is known as the "Universal Ant Exterminator," and is stocked by Messrs. Henwood, Son, Soutter & Co.; it is more adapted, however, to the treatment of large nests when occurring in the open than to those actually built in the house. The machine is in two parts, the one being an air-pump, and the other a furnace, the two connected up with a short rubber hose.

A charcoal fire is first started in the furnace, and by pumping is thoroughly set alight. A little powder is then sprinkled over the fire and the lid closed. By continuing the pumping, a dense cloud of poisonous smoke is driven through the flexible hose attached to the furnace. In use, the nozzle is inserted into a gallery of an ants' nest and the smoke pumped in for two or three minutes. Of course all other entrances to the nest must be closed up with earth; these are soon revealed by the issuing smoke. After the operation, the entrance to the gallery operated on should also be filled up, and the nest left undisturbed for at least a week.

If it is not practicable to buy or use one of these machines, either carbon bisulphide or paraffin may be employed. Follow the ants back to the point of their disappearance, and if this in the wall inject either bisulphide or paraffin into the aperture.

Nests in the open may also be treated with carbon bisulphide, and it is sometimes recommended that the fumes should be exploded inside the nest. After charging, cover the hole for about two minutes, a wet sack being used for this purpose. When this time has elapsed, take a lighted stick—about six feet long—and apply to the opening. This will ignite the then ascending fumes, and, travelling downwards, will explode and thus drive the fumes into the innermost recesses of the nest. The results are much better when done in the evening, as the workers have then all returned to the nest.

This liquid is very inflammable and is highly volatile. The fumes ignite and explode readily, and therefore naked lights should never be used when working with it.

When the ants are found to be grossly infesting a house, as in your case, recourse should be had to baits. The best of these consists in placing small bits of sponge moistened with sweetened water in the spots where the ants congregate most, collecting the sponges once a day, soaking them in boiling water, and then replacing them. I might mention here that the use of boiling water, when procurable in large quantities, is one of the best recommendations which I can make for the treatment of ants in their nests. A piece of fresh meat also acts as an excellent bait.

A syrup, made by dissolving sugar and borax in hot water, is said to be very efficacious when employed against this pest. Teaspoonfuls of the mixture should be placed on pieces of paper, and these distributed where the ants are generally observed.

I would be glad to hear what success attends your efforts to combat this little pest, and trust that the information placed at your disposal herein will help you to attain the desired end.—Yours faithfully,

ALBERT KELLY.

Notes on Co-Operation.

By E. T. MULLENS, Secretary, Minister of Agriculture.

What to Co-operate With?—Mr. G. W. Horton, of Acton Homes, in a letter which appeared in the *Natal Witness* of the 8th April, asked, with reference to my article on the subject of co-operation in the last issue of the *Journal*, "What are we to co-operate with?" Mr. Horton also stated in the same letter:—"The British labourer does (metaphorically) not care for his next door labourer as long as he has the brains God gave him to do his duty, and bring up his family on the land, and for the land."

My answer to Mr. Horton as to *what* we are to co-operate with, is "brains." We must co-operate with intelligence, with ordinary common sense and foresight; in short, with brains.

Mr. Horton's reference to the typical farmer who goes about his own business without worrying about his neighbours, shows that he, in common with many others, has not yet grasped the significance of co-operation. Had he done so, he would have asked not *what* are we to co-operate with, but *whom* are we to co-operate with; and the answer would have been, and is, "with that very neighbour whom the typical farmer only too often considers it form to ignore." Co-operation is based, as Mrs. Humphry Ward declares love is, on propinquity; and will increase neighbourliness, by showing the value of having neighbours. Until farmers realise that the men with whom they have to co-operate are their next door neighbours, we shall never make any headway with co-operation.

To start co-operation in any neighbourhood it is not necessary to form a society or to raise any money in shares. A start can be made by arranging with a neighbour or neighbours to buy jointly manures or implements, so as to obtain the benefit of truck load weight on the railway and more favourable prices from the merchants on account of the larger order. Neighbours now often lend one another baling or other machines. This is co-operation; and, working on a larger scale, there is no reason why neighbours should not jointly erect drying or storing sheds; go shares in mowing machines or machines for dealing with mealies, fibre and other crops; and arrange a mutual transport service. There is no object in co-operating merely for the sake of co-operating; but it would be very difficult to find a case in which it would not benefit a farmer in some way or other to work in with his next door neighbour. The delivery of supplies to a creamery or a collecting station furnishes a good instance. There are cases to my knowledge where each neighbour sends his small supply by his own kafir or cart, resulting in the milk or cream reaching the creamery by a half a dozen or a dozen different means of conveyance, whereas one small cart would have been sufficient to have conveyed the lot. No one being willing to take the initiative, this state of things may go on indefinitely. In every neighbourhood, co-operation is merely waiting for the backward man to come forward, for someone to make up his mind to take the initiative and make a start with a few kindred spirits; and if these few words are the means of inducing but one person to make a start in his own immediate neighbourhood, they will not have been written in vain.

Mealie and Fruit Co-operation.—The election by the Natal Agricultural Union at its last meeting of committees to consider the question of co-operation in connection with the sale of mealies and fruit marks a very important stage in the co-operative movement in Natal. Mr. G. D. Alexander, who, when President of the Union a few years ago, did his best to bring about a co-operative concern on what some then considered too ambitious a scale, was again the mover in this matter, and certainly deserves the thanks of the farming community for the initiative he has taken. Experience in other parts of the world has shown that there is every hope of success when co-operation begins with the disposal of one article of produce, such as milk, corn, etc., as then the interests of those co-operating are identical, and there are not likely to be secessions by those desirous of selling small parcels outside of the Association. It was, therefore, wise to form two distinct committees, one to consider the question of a mealie-growers' union and the other to consider the formation of a fruit-growers' union. A most healthy sign was the disposition shown by the members of the Union to work out the details of the mealie exportation themselves, and not to rely on the Government. Self-help should be the underlying spirit of all co-operation, and, therefore, whilst accepting the help of the Government so far as the railway and steamship freights were concerned and being desirous of working hand in hand with the Government, the delegates rightly decided that they ought themselves to work out all the details of the scheme, and, so far, relieve the Government of responsibility. In welcoming the formation of a central fruit-growers' union, it is not overlooked that one already exists in the Natal Orchard Association already mentioned in these columns. It is, however, very desirable that every agricultural organisation should come under the wing of the Natal Agricultural Union, and there is no reason why the promoters of the Natal Orchard Association and the committtee recently appointed by the Union should not enter into correspondence with a view to bringing about the creation of a far stronger combination of fruit-growers than would be possible were each to work on separate lines.

The Natal Creamery.—Efforts are being made to amend the constitution of the Natal Creamery with a view to making it a proper co-operative concern, and rendering it eligible for financial assistance under the Agricultural Development Act of 1904. In this connection it may be mentioned that the Cape Department of Agriculture has been resuscitating defunct creameries in that Colony, and that the concerns so assisted by that Government are now competing in Johannesburg and Pretoria with our own Natal Creamery. The terms on which the Cape Government is setting those creameries on their legs again are that a Government loan is granted in each case at 6 per cent. interest on first mortgage bond, 4 per cent. being interest and 2 per cent. sinking fund, extending over a period of 27½ years. The farmers have to guarantee supplies of cream for a period of three years, and the Cape Government exercises rights of supervision so as to ensure good management and the supply of cream in good condition.

In reply to a letter of mine in which I advised him of the action being taken in connection with the Natal Creamery, Mr. P. J. Hannon, the Superintendent of Agricultural Co-operation of the Colony of the Cape of Good Hope, wrote that he was satisfied that this was the only way in which success could be achieved in any part of the country, viz., the working on purely co-operative lines. Mr. Hannon at the same time stated that it might be possible to arrive at a business arrangement between the Cape and the Natal Creameries which might be of mutual advantage.

Bacon Factories.—As most Colonists are aware, a bacon factory used to exist at Richmond, which, from various causes, came to grief. The Noodsberg Road people a short time ago talked of starting a co-operative bacon factory, and now both the people of Mooi River and of Camperdown are discussing the same question. The residents of the latter district seem the most energetic in the matter, and there is every hope of success if suppliers will only guarantee a minimum number of pigs to be supplied monthly. One centrally situated co-operative concern ought to suffice for practically the whole of that portion of Natal served by the main line of railway; and it will be a pity if rival concerns are started at two such centres at Camperdown and Mooi River. It is, therefore, sincerely to be hoped, if each district is determined to go on with the concern, that meetings will take place representative of each district with a view to the selection of a site for one central factory to serve all parties. Failure of supplies is the breaker ahead of all bacon factories in Natal, and that danger will be greatly lessened if suppliers will only agree to combine and have but the one factory. A badly supported factory will be almost compelled to accept inferior animals in order to keep going; whereas one central factory ought to be in a position to refuse to accept ill-fed and inferior animals and to impose conditions similar to those which have led to the extraordinary success achieved by the Danish co-operative concerns.

General.—The enquiries received by the Department of Agriculture on the subject of co-operation are very hopeful as to the future of the movement, coming, as they do, from every district in Natal. Every information will be willingly supplied on application being made to the Secretary, Minister of Agriculture, Pietermaritzburg; and copies of rules for co-operative societies can be had for one shilling each from the Stationery Storekeeper, Colonial Office Buildings, Pietermaritzburg. It is probable that, later in the year, Mr. P. J. Hannon, the Cape Expert, may be able to address a few meetings in Natal on this subject. It may be mentioned that Mr. Hannon was one of the strenuous workers who, under Mr. Horace Plunket, did so much for Irish agriculture, and that he formed one of the first deputations which was sent from Ireland to Denmark to report upon agricultural organisation there.

A Town Farmer.

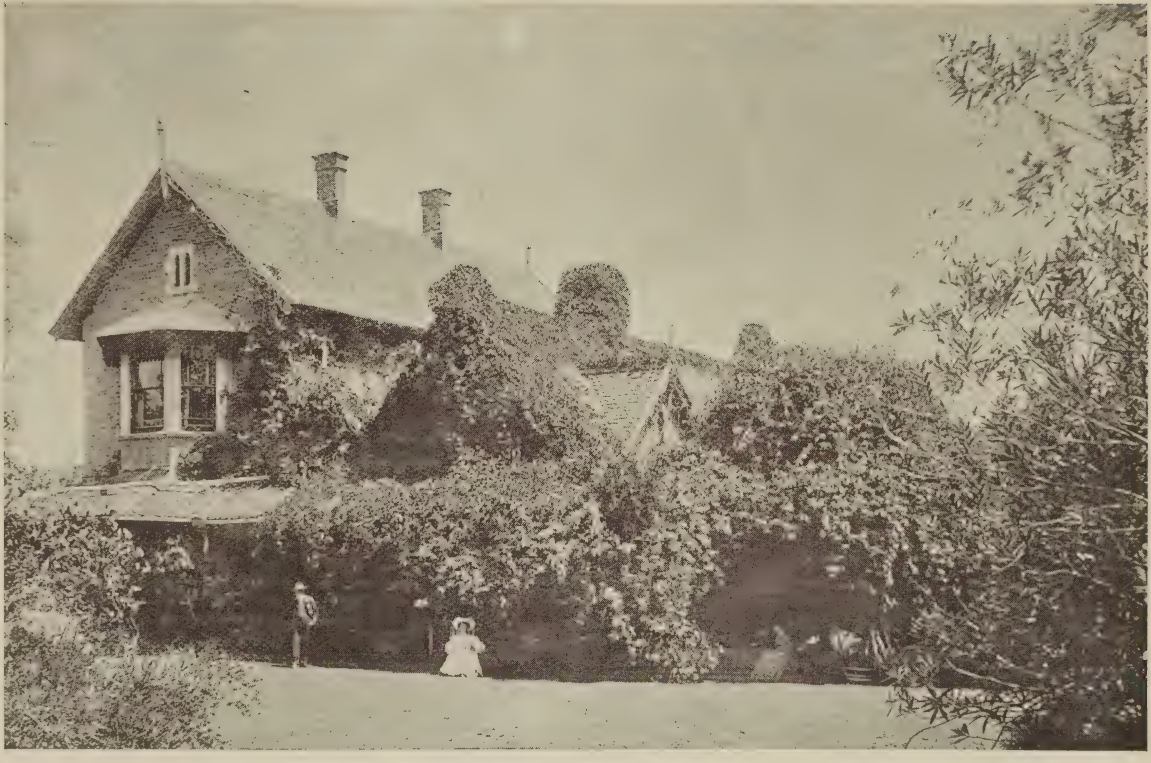
MR. ROBERT TOPHAM, J.P., PENTRICH GRANGE.

Ergates writes:—A few weeks ago when meeting Mr. Robert Topham by chance we had a short conversation, not on frocks, frills, etc., but on the weather and crop prospects. I expressed some surprise at the interest he took in farming. "Well," he said "I am a farmer; come and see my place." This I did a few days later.

Pentrich is the name of Mr. Topham's farm or place, and is situated on the Umsindusi about a couple of miles from town. Here he has a little over 100 acres under mealies, mabele, and winter crops. He has experimented with practically every agricultural crop; thirty years ago he was growing lucerne. He was one of the earliest growers of tobacco in the Colony; the seed—Virginian—he got with great difficulty from America while the Secession war was still in progress. Seed which he got from his plants became distributed through South Africa; to any one who asked for it some was sent. Upland cotton seed he also obtained from America at the same time, and seed from his plants he similarly distributed. Mr. Topham has always taken a great interest in forestry. He has planted largely, but much of the soil of his plantations is not well adapted for trees; he wishes now that years ago he had, in a suitable district, planted thousands of acres. When in the Town Council some 30 years ago he succeeded in getting through a motion for largely planting the Town Bush Valley with Eucalypts for eventually providing railway sleepers. In the following year he went for a trip to England, and during his absence his opponents got the motion rescinded. He is firmly of opinion that the municipal rates would now have been small or even non-existent if his proposal had been carried into effect. The grounds about the house are very beautiful and contain specimens of trees innumerable, from sub-tropical paw-paws to English oaks and hawthorn. To all parts of the world he wrote for tree seeds and in turn he distributed seed from the trees he raised, and, further, he always gave with the packets some relative information from his own experience.

The house, of which an illustration is given, was built in 1866, and for a long time must have been one of the largest and best built in the Colony. The interior wood work is solid and handsome and is all from indigenous timber.

The British Vice-Consul at Adis Abeba (Abyssinia) states, in a recent report, that a new system has recently been introduced for the preparation of *Sanseveria* fibre, the machine employed turning out one metric ton of fibre in six hours. The fibre is said to fetch from £4 to £8 per ton in European markets.



NATAL HOMESTEADS.

"Pentrich Grange."—Mr. Robert Topham, J.P.

Wood and Bark.

By F. C. Fernando, Forester.

Wood is the principal product of forests. It is to a great extent the material on which a forest owner depends for his profit on the outlay in the formation and management of a forest. Wood being an organic structure varies considerably in quality, not only in different species of trees, but also in different trees, and even in different parts of the same tree. In view of the foregoing, it is incumbent upon the forest owner or manager—to some extent at least—to acquaint himself with the structure, and development, of the material in which he deals; and how, and to what extent, its growth and technical properties may be regulated by skilled forest management; so that it may best meet the demands made upon it in the different industries, and thereby increase its value in the market.

While a merely mechanical knowledge of wood would meet the requirements of the timber merchant, or the engineer, it would hardly that of the forester. He needs a more comprehensive knowledge of wood. He should be acquainted with it not merely from its mechanical, but also from its natural and physiological point of view. In other words, he should study wood as an organic structure through all its vicissitudes of development in the stem of a living tree. It is only then he will be in a position to comprehend how, by the judicial adjustment of the environment of a tree, it is possible, to a great extent, to control—within the limits attainable for that species—the quality of the timber produced by it.

I do not feel able to handle the subject of wood in the manner outlined by considering it apart from bark—by which term I mean all tissues exterior to the cambium—Nature has so intimately connected the two in the life economy of the stem that such a separation appears artificial and arbitrary; and would at the outset destroy the physiological significance of the subject. Happily, bark forms the staple of one very important Colonial forestal industry; and that is an added justification for its inclusion. I shall therefore treat of the structure and development of the stem as a whole, making, however, particular reference to wood. By giving the subject a sufficient latitude, I shall further endeavour to enlist the interest of the reader who may wish to become acquainted with it, not so much from a forester's as from a naturalist's standpoint.

1. The Cell.—Every animal, and every plant, consists at its earliest inception of a single cell. In the lowest plants, such as Bacteria, the life history of the plant begins and ends with the single cell. In the higher plants myriads of cells combine to build up the plant body. If we dissected any part of a multi-cellular plant into its component

elements, we should ultimately arrive at the single cell. The cell is therefore the unit of structure of all vegetable organs. In order then to obtain an intelligent grasp of the anatomy of such a complicated structure as the stem of a timber-producing tree, it is well that we should as a preliminary acquire an insight into the structure and behaviour of vegetable cells, both as units, and in combination.

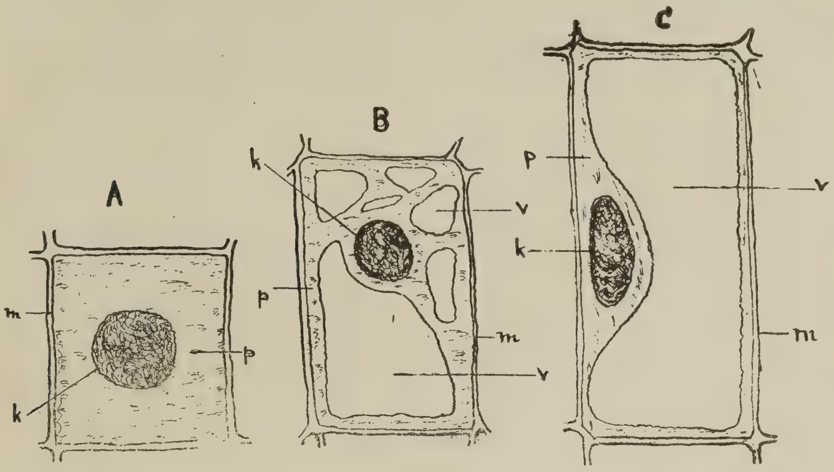
(*a*) The cell as a unit.—The cells composing the body of a plant are generally so very small as to be distinguishable as units only under the microscope. In a few cases, however, they are large enough to be seen by the naked eye. If the succulent leaf-stalk of a banana plant was cut through the middle, the section would reveal a large number of rectangular or cubical, almost transparent, cells aggregated into a succulent tissue. A cell (Fig. 1, A, B, and C) consists, essentially, of a specialised fragment of protoplasm (Fig. 1, p) surrounding a potential centre of greatest activity, consisting also of protoplasm, but differentiated from the general mass, and termed the nucleus (Fig. 1, k). Protoplasm, it should be said, is a proteinaceous substance of a jelly-like consistency; and is the basis of all vitality in both series of the organic world. It is the basis of life. It is not life; but is the medium through which life is manifested. So there is, and can be, dead protoplasm.

In the vegetable kingdom, the protoplasmic body, composing the essential cell, is at a very early age completely invested by a firm membrane or cell-wall (Fig. 1, m) produced from the protoplasm, but consisting of inert, or dead, matter.

After a time a cell may lose its protoplasmic contents, either partly, or altogether. In the former case the protoplasmic body is invaded by a number of cavities, termed vacuoles (Fig. 1, v) filled with watery cell-sap. Later these vacuoles may run together and form a single large cavity or vacuole, the protoplasm then lining the interior of the cell-wall as a thin layer, the nucleus, however, in both stages remaining within the cell (Fig. 1, B and C). In the latter case, the protoplasm is altogether replaced by water, containing various salts in solution; or by air. The cell is in that case dead, and only serves a mechanical purpose in the economy of the plant.

The cell is capable with growth and development of assuming a variety of shapes. Thus, it may be cubical or rectangular (Fig. 5, A, and Fig. 1, B and C), and flattened or tabular (Fig. 3, T). It may grow long and cylindrical with blunt ends (Fig. 3, B); or long and tapering at the ends (Fig. 3, C), etc., etc.

Simultaneously with the growth and development of the cell, the cell-wall may undergo a change in its character. It may become soft and mucilagenous, or suberised like cork; or hard and woody—lignified—like the cells in wood, or the stone of certain fruits. These changes are accompanied by a thickening of the cell-wall by a succession of concentric layers deposited on the inner face of the original wall.

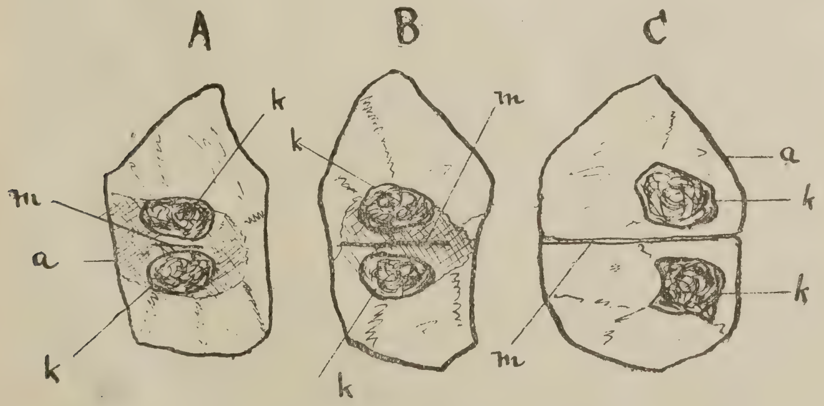


(From Strassburgher's "Text-book of Botany.")

FIG. 1.—CELLS FROM THE VEGETATIVE CONE OF A PHANEROGAMIC PLANT (Diagrammatic).

A—Embryonic. *B and C*—Later stages. *p*—Protoplasm. *k*—Nucleus. *m*—Cell walls. *v*—Vacuoles.

(*b*) Cells in combination.—Living cells are sometimes capable of multiplying by division. The process may be explained as follows:—The nucleus of each cell divides into two, and the protoplasm arranges itself around each half. A cell-wall is next formed between them, thus dividing the mother cell into two daughter cells, which, however, remain in contact (see Fig. 2).



(From Strassburgher's "Text-book of Botany.")

FIG. 2.—THREE STAGES IN THE DIVISION OF A LIVING CELL.

a—Cell wall. *k*—Nuclei. *m*—Dividing membrane.

These daughter cells may be themselves capable of division; so that ultimately from a single cell an aggregate of cells is produced.

Such an aggregate of cells, of similar origin and character, exercising a common function, we call a tissue (see Fig. 3, D and E, also Fig. 5, A).

We may group tissues according to their function, and according to their structure. According to their function we designate tissues as Meristein and Permanent Tissue.

Meristein is a tissue in which the component cells are rich in protoplasmic contents; and capable of multiplying by division. "Meristein" is derived from a Greek word meaning "divisible," and expresses the essential feature of such a tissue. Meristein is a nascent tissue, and is admirably adapted for such parts of plant organs as are actively growing, but whose characters are not formed. When, by the activity of such a tissue, a sufficient mass of material has been accumulated, the cells lose their meristeinatic character. It is now an adult tissue, and the vital energies of the plant are expended in moulding its characters; in giving to this mass of accumulated material its distinctive features. Such an adult tissue whose cells are no longer capable of division is known as Permanent Tissue.

Although in the ethics of vegetable tissues, the cells of a permanent tissue are recognised as being incapable of division—and they invariably are so—it sometimes becomes necessary, in the course of the development of an organ, that certain layers of cells of such tissue should resume their activity and again become meristeinatic. Such portions of a permanent tissue as have reverted to the meristeinatic state we dis-

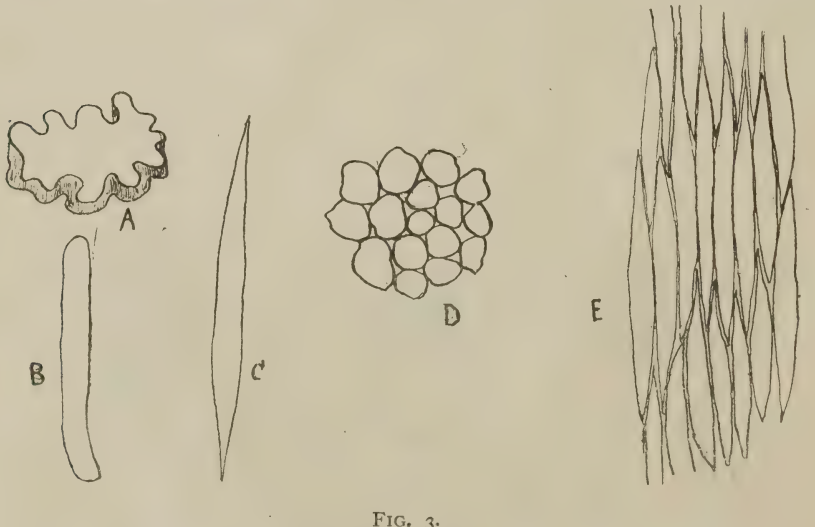


FIG. 3.
A to C—Different forms of cells. *D*—Parenchyma. *E*—Prosenchyma.
(Diagrammatic.)

tinguish as Secondary Meristein, in contradistinction to Primary Meristein, in which the cells since their inception have remained meristeinatic. Such a Primary Meristein always occurs in embryonic rudiments, and at the growing tips of roots and shoots.

According to the structure, we speak of tissues as Parenchyma and Prosenchyma. In their extreme forms the distinction between the two is not very sharp. Typical Parenchyma is a tissue composed of cells about as long as broad—that is, isodiametric—and rich in protoplasmic contents (Fig. 3, D, and Fig. 5, A). Typical Prosenchyma is a tissue composed of elongated cells with pointed, tapering ends, dovetailing into each other; and with little or no protoplasmic contents (Fig. 3, E).

A parenchyma in which the cells are elongated resembles prosenchyma, but may be distinguished by the absence of pointed and interlocking cell terminations, and a greater abundance of protoplasmic contents. On the other hand, prosenchyma cells rich in protoplasm can always be recognised by the pointed and interlocking terminations.

Thus far we have dealt with combinations of cells known as tissues. It will be noted that, in the formation of tissues, the productive activity was centrifugal. A mother-cell, or cells divided, resulting in several daughter-cells of equal value, with the mother-cell or cells. Each of these daughter-cells was again capable of division, repeating the process already described. A single unit acting as a centre of activity therefore resulted in several such units of equal value.

It is, however, possible for several individual cells to combine or fuse to form a single unit of a higher order. Here the order of activity is reversed. It is centripetal. This process is known as cell-fusion, the resulting structure being termed a vessel (Fig. 4, A). It is, in plain words, a long and extremely fine tube composed of several elongated cells cemented together by their ends; the dividing transverse walls or septa of the individual cells becoming wholly absorbed, when the structure is termed a true vessel or merely a "vessel," or only perforated in a sieve-like manner (Fig. 4, B), when the structure is termed a sieve tube or bast vessel.

(*c*) Tissue systems.—There is manifested in every organic structure a wise and beautiful design; a perfect adjustment between construction and office; an economic distribution of labour. Nature is no blunderer, she is no spendthrift. This revelation of law and order and economy in things organised is peculiarly inviting to the human mind, coinciding, as it does, with human ideals. Its realisation and contemplation belongs to the philosophy of the science, and forms one of the many fascinations that gild the study of natural history.

We may therefore view our stem as a house in order; an organisation the functions of which are assigned to several component departments, with a due regard for every physical law for mutual fitness and the policy and well-being of the whole plant.

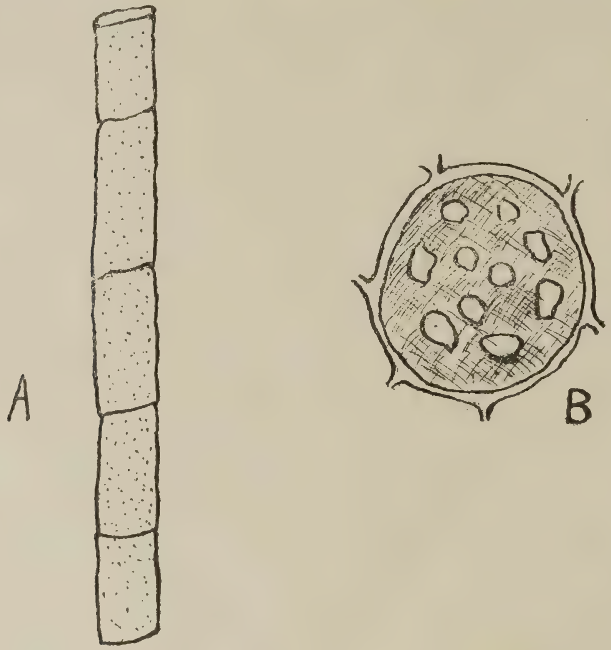


Fig. 4.

A—Fragment of a vessel. *B* – Perforated septum of a bast vessel (diagrammatic.

The body of a highly-organised shoot does not therefore consist of a mass of homogeneous tissue of equal value, and performing common or unlimited functions. That is only true of it as a rudiment—material, nascent, plastic, admitting of further, and higher, development. Simultaneously with such development follows a differentiation in its structure. Masses of tissue combine to form distinct units, termed tissue systems, each best adapted to perform a function, or group of functions, peculiar to that organ. We may therefore define a Tissue System as a combination of tissues to form a distinct and specialised unit in the structure of a plant organ.

Cells then combine to form tissues. Tissues combine to form tissue systems. Tissue systems combine to form organs.

In the shoot of a highly developed plant—as, indeed, in all developed organs of such plants, whether stem, leaf, or petal, etc.—we may distinguish three tissue systems, designated as follows:—

The Fundamental System, forming the groundwork or basis of the organ, engaged in the assimilation of food and storage of the same.

The Tegumentary System, acting as a protective envelope, or covering, to the organ.

The Vascular Bundle System, affording permanent rigidity to the whole structure, and serving the purpose of conduction.

2. The Primary Tissues.

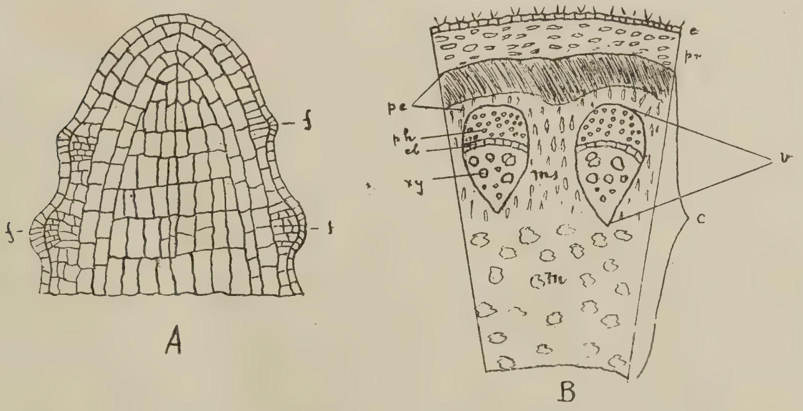
(*a*) Origin and definition.—We are not in a position to deal with our subject in a more concrete form.

If under the microscope we examine the extreme growing tip of some flowering bud, shrub or tree, we should find a mass of parenchymatous, cubical cells, arranged in the form of a blunt cone, somewhat like that figured in the diagram (Fig. 5, A).

This cone of actively growing and dividing cells is distinguished as the Vegetative Cone, or the Growing Point, and always occupies the extreme tip of an elongating shoot.

It should be noted that the tissue of the Vegetative Cone is meristematic. It is moreover a primary meristem. All those permanent tissues which will later be derived directly from this primary meristem are distinguished as Primary Tissues. The mass of tissue formed behind the growing point shortly—except at certain points—loses its meristematic character, becomes permanent, and, as has already been stated, differentiated into the three tissue systems comprising the older parts of the shoot.

(*b*) Distribution of the Primary Tissues.—The first tissue system to become differentiated as such is the Tegumentary System. The reason is obvious. The young tissues formed by the activity of the growing point, must be protected from external injury, too rapid an evaporation of the water in its cell contents, etc. The whole of the young organ accordingly becomes invested in a thin skin or Epidermis (Fig. 5, B and b, e) formed usually by a single layer of cells. The lateral



(From Strassburgher's "Text-book of Botany.")

Fig. 5.

A—Vegetative cone. *f*—Leaf rudiments.

B—Part of a transverse section of a young Exogenous shoot. *e*—Epidermis. *pr*—Primary cortex. *c*—Central cylinder. *pc*—Pericycle, in this case with a ring of sclumchyma fibres (shaded dark). *v*—Fibro-voscular bundle. *ph*—Phloem. *xy*—Xylem. *cb*—Cambium. *m*—Medulla. *ms*—Primary medullary ray.

and outer walls of these cells become corky in character, and are thus well adapted for the function to be performed by the epidermis. On the outer surface of the epidermis there may be such outgrowths as hairs, which augment the function of the former. The epidermis is the only representative of the tegumentary system proper in shoots. With the formation of secondary tissues it becomes cast off, so that, strictly speaking, there is no representative of the tegumentary system in the older parts of the stems and branches of trees and shrubs, the office of protection being performed by the dead, and more or less corky, layers of tissue investing the stem, and popularly termed bark.

The core of tissue enclosed by the epidermis represents the Fundamental Tissue System. It is at first entirely composed of similar cells. Soon, however, a difference becomes apparent between an outer zone of small-celled and firm-textured tissue, adapted for assimilation, and an inner core of large-celled and loose-textured tissue adapted for storage. The zone of small-celled and firm-textured tissue is known as the Primary Cortex (Figs. 5, B, and 6, pr). It lies immediately within the epidermis, and its cells, being fitted for assimilation, contain the green pigment known as chlorophyll. It is these cells, seen through the colourless and transparent epidermis, that give a green tint to the surface of twigs. The cylinder of large-celled and loose-textured tissue enclosed within the primary cortex has been designated the Central Cylinder or the Stele (see Figs. 5, B, and 6).

In those plants occupying positions in the scale of vegetable organisation from the club-mosses and ferns upwards, the capacity to absorb water, containing nutrient mineral salts in solution, instead of being possessed indiscriminately by the whole surface of the plant body, is confined to certain well-defined organs, termed roots (in a strictly botanical sense). A contrivance therefore becomes necessary whereby the water absorbed by such roots—inserted generally at one end of the plant axis—may be conducted to the leaves, placed at or about the opposite extremity of such axis. In such plants therefore special conducting tracts of elongated cells, differentiated from the surrounding tissues, first become apparent, supplying the necessity that arose with the higher organisation of plants.

Such conducting tracts, or, as they are also termed, vascular strands, form the circulatory system in the higher plants. They also give permanent mechanical rigidity to organs, acting like girders in bracing up stems, and as veins, forming framework and determining the outline of such flattened structures as leaves and petals. These vascular strands (v, Figs. 5, B, and 6) represent the Vascular Tissue System. In the history of vegetable development the Vascular Tissue System, specialised as such, was of all tissue systems the last to appear. Correspondingly, in the differentiation of a young shoot, it is also the last to appear.

The disposition and behaviour of these vascular strands in Endogens, *e.g.*, palms, grasses, sedges, etc., whose stems do not increase in diameter annually; and Exogens, or those plants whose stems increase in diameter from year to year by the addition of concentric layers of wood and host, *e.g.*, gums, pines, stinkwood, yellow-wood, etc., are not identical. Since the wood of the latter is at present the only source of Colonial timber, we shall confine ourselves to the consideration of Exogens only.

In the shoot of an Exogen these conducting traces, or vascular strands, occur as longitudinal strands, traversing the ground tissue of the central cylinder, and, arranged in a ring, immediately within its periphery (Fig. 6). Each such strand is termed a Fibro-vascular Bundle (v), and exhibits in transverse section a more or less pear-shaped outline, with the pointed end directed towards the centre of the shoot (Fig. 5, B, v). At first each bundle consist of similar meristematic cells. Later the greater number of these cells lose their meristematic character, and pass into permanent tissue, becoming elongated, and specially fitted for conduction. Each bundle now consists of the following parts:—An outer Bast or Phloem portion (Figs. 5, B, and 6, ph). An inner, Xylem or wood portion (xy). A band of meristematic tissue between the two, termed the Fascicular Cambium (ch). This cambium plays a very important part in the formation of secondary tissues, and will be referred to again.

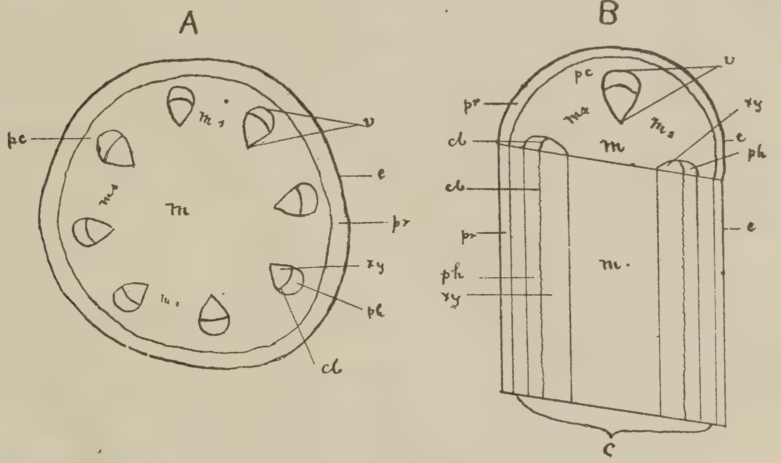


FIG. 6.—SECTIONS OF AN EXOGENOUS STEM ILLUSTRATING DISTRIBUTION OF PRIMARY TISSUES (Diagrammatic).

A—Transverse section. *B*—Longitudinal section. *e*—Epidermis. *pt*—Primary cortex. *c*—Central cylinder. *pc*—Pericycle. *v*—Fibro-vascular. *ph*—Phloem. *xy*—Xylme. *cb*—Cambium. *m*—Medulla. *ms*—Primary medullary ray.

The narrow zone of the ground tissue of the central cylinder now left immediately outside the ring of Vascular Bundles is termed the

Pericycle (pc Figs. 5, B, and 6). Distributed in the moss of the pericycle are often found elongated, thickened and hardened prosenchyma cells or fibres (Fig. 5, B). Physiologically considered, they are functionless, but they greatly assist the vascular strands in maintaining the mechanical rigidity of the stem.

That portion of the ground tissue enclosed by the ring of vascular strands, and forming by far the largest proportion of a young shoot, is termed the Medulla or Pith (Figs. 5, B, and 6, m), and is well adapted for storage. Finally, the radial rays of ground tissue, connecting the pericycle with the medulla, are known as the Primary Medullary Rays (ms).

From a purely mechanical point of view, the fabric of a young exogenous shoot may be said to consist of: a peripheral shell of firm and close-textured tissues, surrounding a core of large-celled, loose-textured, and soft tissue. This peripheral disposition of the rigid-maintaining elements of the structure proves upon reflection to be the most economical. It ensures a high degree of rigidity at a minimum expenditure of material, and an appreciable reduction of weight. It corresponds with the teachings of Physics; and is precisely the arrangement a modern engineer would adopt in erecting a similar structure with the same objects in view.

Anatomically considered, the Exogenous shoot consists of the following parts:—

1. A ring of Epidermis, representing the Tegumentary Tissue System (Figs. 5, B, and 6, e).
2. The Fundamental or Ground Tissue System, comprising:—
    - A. A zone of Primary Cortex (Figs. 5, B, and 6, pr).
    - B. The Central Cylinder (c), consisting of:—
        - (*a*) The Pericycle (pc)—a zone of ground tissue lying outside the vascular strands.
        - (*b*) The Medulla or Pith (m), enclosed by the vascular strands.
        - (*c*) The Primary Medullary Rays (ms), connecting the Medulla with the Pericycle.
3. The Vascular Bundle System, consisting of a ring of vascular strands, traversing the ground tissue, each termed a Fibro-vascular Bundle, and consisting of:—
    - (*a*) An inner zone of Xylem or wood (Figs. 5, B, and 6, xy).
    - (*b*) An outer zone of Phloem or Bast (ph).
    - (*c*) An intermediate zone of meristem termed the Fascicular Cambium (cb).

The reader should not depend on the diagrams alone for an illustration of the distribution of the various tissue systems in the young shoot. He should locate them for himself in living specimens. For this purpose he should select young shoots of such soft and herbaceous plants as the balsam or gourd, or the rapidly-grown spring shoots of such a tree as the real yellow-wood. The kind selected is, however, immaterial, but it is necessary that the shoot be succulent and rapidly developed, because in such shoots the parts to be examined are not quite so minute as in shoots more slowly developed. Next with a sharp pocket-knife a few thin, transparent slices, both transverse—some near the growing tip, and others lower down—and longitudinal, are made. He should then place these on a slip of glass, or hold them up to the light, and examine them with the strongest magnifying glass at his disposal.

We are now acquainted with the anatomy and distribution of the Primary Tissues in an Exogenous stem; and here the present instalment of this paper must end.

Wood and bark, as they are generally understood, both in Conifers, *e.g.*, pines, cypresses, araucarias, and yellow-wood; and in Dicotyledons, also known in forestal parlance as "broad-leaved species," *e.g.*, gums, oak, sneezewood, stinkwood, etc., are a product of secondary tissues, and will be dealt with in the succeeding number of this *Journal*. It should, however, be borne in mind that such Secondary Tissues are repressions of the continued activity of Primary Tissues. Therefore in the stems of all plants exhibiting secondary growth the Primary Tissues are the first to appear—as the dissection of a young and rapidly-grown shoot will reveal—and comprises incipient wood or bark. In beginning with a description of the Primary Tissues, I have therefore been consistent with Nature, and thereby placed the reader in a correct relation to the subject; and afforded him, I hope, a coign of vantage from which he may follow the subject in an intelligent manner.

(*To be continued.*)

Inter-Colonial Veterinary Conference.

MEETING AT BLOEMFONTEIN.

On the 5th, 6th and 7th of March, representatives of Cape Colony, Natal, Transvaal, Orange River Colony, Rhodesia, Basutoland, Bechuanaland Protectorate, Lourenco Marques, and German South-West Africa met at Bloemfontein to discuss the framing of uniform regulations for inter-colonial movements of stock.

Owing to the prevalence of East Coast Fever in the Transvaal and Natal, and Lungsickness in the Cape Colony, it was not thought advisable or possible to frame any practical regulations for inter-colonial movements of horned cattle.

In all eighteen resolutions were adopted by the Conference. As a whole, they are, in the opinion of Mr. S. B. Woollatt, Principal Veterinary Surgeon, of a practical nature, and the outcome of what is known to be necessary to safeguard the interests of the various Colonies against the introduction of disease over their borders, and to place upon individuals the least inconvenience consistent with efficiency.

Of the resolutions passed by the Inter-Colonial Conference, seven deal with and prescribe precautionary measures for stock in transit, three deal with dipping, two with glanders, one with rabies, and one with lungsickness; and the remaining five deal with ports of entry, disinfection of trucks used for the conveyance of live stock, and general matters.

EAST COAST FEVER AND THE MOVEMENT OF SHEEP AND GOATS.

On the motion of Mr. Grist (O.R.C.), it was resolved:—

"That all restrictions hitherto placed on the movement of sheep and goats for the purpose of preventing the spread of East Coast Fever be withdrawn. (*Resolution No. 1.*)

PORTS OF ENTRY.

Mr. Gray (Transvaal), seconded by Mr. Woollatt (Natal), moved:—

"That mutual ports of entry for the introduction of small stock should be established, and that the cost of establishment and maintenance of such mutual ports should be divided between the Colonies using such ports. (*Resolution No. 2.*)

This resolution makes provision for sheep entering a Colony for winter or summer grazing.

SHEEP AND GOATS IN TRANSIT.

Resolutions 4, 5, 6, 7, 8, 9 and 12 deal with precautionary measures in the transit of sheep and goats. Resolution 4 Mr. Woollatt considers a very necessary one, governing, as it does, the entry of sheep by rail. It is understood that it is not practicable to detrain sheep at a port of entry for the purpose of dipping; particularly as at some ports of entry the dip is not adjacent to the railway. The following is the resolution in question:—

"That all sheep or goats exported from one Colony to another by rail should be certified to be clean by an Inspector of Stock in the Colony from which they are exported, should be dipped once under the supervision of such Inspector, and should pass the port of entry within ten days of each dipping. At the port of entry the sheep or goats should be examined by the Inspecting Officer, who should allow them to proceed to their destination if he finds them dipped, free from scab, and their certificates in order; and, on reaching the detraining station or on arrival at destination as the receiving Colony concerned may prescribe, these sheep or goats should again be dipped under supervision within a period of not more than 16 days from the date of the first dipping.

"This resolution is not intended to affect any Colony through which sheep or goats may pass by rail in transit from one Colony to another."

Resolution No. 5:—"That sheep or goats intended for immediate slaughter purposes should be admitted by rail under the same conditions as others, except that they be exempted from being dipped on arrival at their destination, provided they are accompanied by a declaration that they are intended for slaughter within ten days of being admitted, and provided that they are plainly branded on the back with a distinctive brand to be hereafter decided upon."

Resolution No. 6 recommends:—"That sheep or goats certified by the owner to be intended for exhibition purposes and accompanied by a certificate of health from a Government Veterinary Surgeon or Stock Inspector should be allowed to pass from one Colony to another by rail without dipping, provided they are declared as visibly clean by the Inspector at the port of entry, and provided a copy of the certificate is previously posted to the Agricultural Department of the receiving Colony."

This resolution is intended to meet the requirements of persons sending sheep for exhibition.

Resolution No. 7 advocates:—"That well bred sheep or goats intended for stud purposes (the onus of proof of which intention shall rest with the consignor) should be allowed to enter another Colony by rail without being previously dipped in the exporting Colony, provided they are accompanied by a certificate from a Government Veterinary Surgeon or Stock Inspector that all the sheep on the farm from which the said stock have been taken have been free from scab for 12 months or longer."

Resolution No. 8 does not really affect Natal, as it applies to sheep in transit from other Colonies.

Resolution No. 8.—"That thoroughbred sheep or goats from oversea, if passed as clean by a Veterinary Surgeon or Stock Inspector at the port of landing, should be allowed to proceed to another Colony without being dipped, provided that, if any delay occurs in transit, the owner be furnished with a certificate from the Government Veterinary Surgeon or Stock Inspector that such sheep since landing have remained clean and have not, to the best of his knowledge, come in contact with any diseased sheep on the premises."

Resolution No. 9 has been formed to make practical provision for dealing with sheep or goats which may be found to be diseased upon arrival at a port of entry. It is not intended to lay down a hard and fast rule that a diseased animal must be sent back to the exporting Colony; but it is considered only fair to give the importing Colony the right to return diseased animals.

Resolution No. 9.—"That exporting Colonies should bind themselves to receive back into their territory from the port of entry infected sheep or goats found travelling by road or rail therefrom without imposing any restrictions upon their re-introduction if such a course be considered desirable by the authorities of the Colony to which the sheep are consigned."

Resolution No. 12 recommends:—"That all cattle imported into South African Colonies from oversea, except cattle branded as intended for immediate slaughter coming from countries in which tuberculosis is not prevalent, should be detained and tested with tuberculin by a Government Veterinary Surgeon at the port of debarkation, whether accompanied by a tuberculin certificate or not, and should not be liberated unless they pass the test in a satisfactory manner. The cost of testing such animals at the port of debarkation should be borne by the importer."

To meet the requirements of this resolution, our Tuberculosis Act would require a slight amendment. Objection to this might be raised on the part of the importers, but it is in their interests to have healthy animals, and the risk of diseased animals reacting here could be overcome by insurance.

All countries have experienced difficulty in accepting tuberculin certificates unless they are prepared to accept some risk of diseased animals entering the country. In consequence, some countries, as Canada, for instance, insist that all animals are tested by their own officer at the port of landing; and Mr. Woollatt is of opinion that, if we intend to prevent animals in the early stages of tuberculosis being brought into this Colony, Natal must do the same.

SHEEP DIPPING.

Three of the resolutions deal with the dipping of sheep, Nos. 3, 10, and 11.

Resolution No. 3, proposed by Mr. Woollatt (Natal), and seconded by Mr. Gray (Transvaal), recommends:—

"That all sheep and goats travelling by road from one Colony to another, except those entering another Colony under special regulations for the purpose of winter or summer grazing, should be dipped at the port of entry and allowed to enter after being examined and passed as visibly free from disease by a competent officer on the condition that a second dipping be carried out within a period to be prescribed by the receiving Colony."

Resolution No. 10 advocates:—"That for the dipping of sheep or goats at the various ports of entry a preparation of lime and sulphur be used. Such preparation to be approved by the Governments of the various Colonies."

There is no doubt, Mr. Woollatt thinks, that one of the chief causes which prevents scab being satisfactorily dealt with, is the need for the compulsory adoption of a uniform dip. The lime and sulphur solution is undoubtedly the most efficacious and safest to use, particularly as regards travelling sheep.

Resolution No. 11:—"That this Conference is of opinion that the

Governments of the various Colonies should combine in order that experiments may be conducted with a view to recommending one dip which shall be considered as an efficacious scab-destroying preparation and which shall embody preventative as well as curative properties."

LUNGSICKNESS.

Mr. Gray (Transvaal) proposed, seconded by Mr. Henning (Basutoland), and it was carried unanimously:—

"That, with a view to preventing the spread of Lungsickness from one Colony to another and in order to obviate the necessity for imposing harassing restrictions generally affecting all movements from Colonies in which the disease is prevalent, it is desirable that steps should be taken to prevent any movement of horned cattle from those districts or parts of a district in which the disease prevails and with respect to native territories in which the disease has broken out, the extent of the areas quarantined should be sufficiently large to ensure the segregation of all animals which may have been exposed to infection. Information of the precise extent of all quarantined areas should be supplied to all neighbouring Colonies." (*Resolution No. 13.*)

GLANDERS.

With regard to Glanders, two resolutions were passed—Nos. 14 and 15.

Resolution No. 14 recommends:—"That steps should be taken by all South African Colonies to ensure the early eradication of Glanders in order that the existing restrictions placed upon movements of equines from one Colony to another may be removed with as little delay as possible, and suggests that the institution of a system of compensation for reacting, but visibly healthy animals condemned and destroyed by order of the veterinary authorities is the most satisfactory and most economical method to adopt in order to stamp out this disease."

It was further resolved (No. 15):—

"That until Glanders is eradicated or brought well under control, it is desirable that equines removed from one Colony to another, with the exception of those classes mentioned in the appended list, should be accompanied by a certificate signed by a qualified Veterinary Surgeon approved by the Veterinary Department and worded as set forth in Schedule "A" attached. Should this certificate not be forthcoming, such imported equines should be detained at the port of entry until they have been tested with mallein, or until the owner has arranged with the Veterinary Department of the receiving Colony for the inspection and testing of such equines.

"The classes of equines which shall be exempt from this regulation should include—

"1. Race horses in training.

"2 South American equines in transit passing direct from the ship to the railway, entering under special permit from the Veterinary Department of the receiving Colony.

"3. Equines brought in for exhibition purposes.

"4. Military and Police horses certified to be coming from units in which Glanders does not exist.

"5 Equines engaged in *bona fide* transport movements across the border travelling under special permit." (*Resolution No. 15.*)

RABIES.

One resolution—No. 17—was passed in connection with rabies:—

"This Conference views with alarm the spread and prevalence of rabies in Southern Rhodesia, and urges the adoption of the most drastic measures in order to prevent the extension of the disease to the Transvaal, Bechuanaland Protectorate, and Portuguese East Africa. For this purpose it is desirable that these Colonies should continue to enforce and, if necessary, impose further restrictions for the effective control of dogs within their territories in order that the introduction of inter-Colonial regulations affecting the movement of dogs therefrom to other Colonies may not be necessary."

DISINFECTION OF RAILWAY TRUCKS.

Resolution No. 18 deals with the disinfection of trucks used for the conveyance of live stock. It was resolved:—

"That every railway truck, or dog box, which shall have been used for the carrying of live stock or skins should be thoroughly disinfected by a responsible railway officer immediately after removal of such live stock or skins. Such disinfection to be carried out in the following manner:—

"1. The interior of such truck or dog box and the litter to be washed by means of a powerful spray with some preparation to be decided upon by the Governments of the several Colonies concerned.

"2. All refuse matter should then be removed and at once burnt and the interior of the truck or dog box well whitewashed. The same precautions should be observed for the disinfection of all places at which stock are entrained or detrained."

REMOVAL OF IMPORT RESTRICTIONS.

Upon the motion of Mr. Von Jordan (G.E. Africa), and seconded by Mr. Woollatt (Natal), it was resolved:—

Resolution No. 16.—"That when any Colony officially notifies the neighbouring Colonies that it is free from any particular diesase for the prevention of which restrictions have been previously imposed, such neighbouring Colonies should at once take all reasonable steps to assure themselves of such freedom from this disease with a view to withdrawing such restrictions."

A New Industry.

INTERVIEW WITH MR. GILBERT WILKINSON.

By ERGATES.

IN the "Short Notes" of the September issue of last year, attention was drawn to the possibility of a methylated spirits industry. Since then I have made some investigation into the subject, and have arrived at the conclusion that:—Firstly, there is an opening for the makers of methylated spirits to do a business running every year into a great many thousands of pounds; and, secondly, that by the use of methylated spirits there would be a very considerable saving in expenditure for every colonist who used paraffin for lamps or for oil-engines. The sugar-makers would make their gains direct, and if "saving money is making money" then all who use paraffin, petrol, gasoline, etc.—practically every colonist—would "make money" by the industry. There are other points: the money that goes out of the Colony for paraffin, etc., would be retained in the Colony, and there can be no doubt that a large demand for the spirits would come from our over-berg neighbours. This would bring the Colony money from outside, to say nothing of providing some cargo for the strings of empty railway wagons constantly being hauled up-country.

For the greater part of the information I have obtained on the subject I am indebted to Mr. Gilbert Wilkinson, of the Ottawa Sugar Estate. With his father, the late Mr. Anthony Wilkinson, I had an extremely interesting "interview" some six years ago; page 457, Vol. IV. Mr. Gilbert Wilkinson, as most know, is the discoverer of the system of locust poisoning now practised in all parts of the world, and, in recognition of which discovery, he was the recipient of a Vote of Thanks from Parliament—also a handsome silver salver. Mr. Wilkinson, like his father, as shown in the interview referred to, takes broad views of subjects of Colonial interest, and it would be wholly erroneous to attribute his views on the alcohol industry solely to his self-interest as a distiller. The subject he understands in all its bearings, and with that knowledge he can put forward arguments in a manner to win conviction.

DE-NATURED ALCOHOL.

In what follows the use of the word alcohol will be more convenient than the popular "spirit" or "spirits," and similarly, the use of the word de-naturing instead of "methylating." The last word is derived from methyl, a wood product originally used for making ordinary alcohol so unpalatable that it could be used only for industrial purposes. Since then other chemicals still more efficacious for the purpose have been found, and in consequence that word methylated is generally giving way to de-natured, a comprehensive and self-explanatory word. Alcohol can be extracted from all vegetable and many other substances. The chief sources are sugar-cane, grapes, beetroot, mealies, and potatoes. Rum comes, or should come, from sugar-cane juice, but the cheap sugar alchohol of comerce is a by-product obtained from the refuse of a sugar factory. No other alcohol can compete with it in Natal as regards cheapness. In the present very limited business in Colonial de-natured alcohol, the price is only 1s. per gallon, say 2d. for a bottle full. To the public this alcohol is variably retailed at 6d., 9d., and 1s. per bottle. These disproportionate profits would, of course, disappear were the use of industrial alcohol to become general.

WHAT GERMANY HAS DONE.

British nature is conservative and everything novel is commonly looked upon with distrust. Examples or precedents are therefore desirable for awakening interest, and happily in this matter of de-natured alcohol there are examples from two of the greatest and most economically advanced nations of the world. Germany led the way. Germany has no mineral oils, and in that respect resembles Natal and South Africa generally. Germans can indeed buy their oils more cheaply than we in South Africa can. Under such conditions it is impossible for any one to say that the example is not a fair one. Germany foresaw that alcohol even when made from potatoes and the refuse of beets could take a superior place to paraffin, petrol, gasoline, etc., and the extent of the industry to-day affords to the world testimony to the wisdom of that foresight. Apart from motor carriages, Germany has about 5,000 small farm and similar engines run by alcohol. As an illuminant it is estimated that alcohol in a proper lamp gives about twice as much light with a consumption of only half that of paraffin. In this connection it should also be borne in mind that the price mentioned for alcohol—1s. per gallon—means the price per imperial gallon, and not the short American gallon of paraffin. A recent exhibition in Germany demonstrated the uses to which de-natured alcohol may be put. There were exhibits of alcohol engines of different makes, alcohol boat-motors designed for the Russian Navy, and motors for threshing, grinding, wood-cutting and other agricultural purposes. There was also a large and varied display of lamps, chandeliers, and street lamps, in which alcohol vapour is burned like gas in a hooded flame covered by a Welsbach mantle. Readers who know England may have noticed this class of lamps in the London A. B. C. refreshmen-rooms and elsewhere. Alcohol heating stoves of ornamental appearance for warming halls and rooms were exhibited in large variety. Also were displayed in endless variety cooking stoves of all sizes, forms and capacities from complete ranges to the simple urn-lamps, or self-heating laundry irons. Mineral oils throw off disagreeable fumes, and are specially dangerous as inflammables. De-natured alcohol throws off no disagreeable fumes, and, in the event of accidental fire, it can be extinguished with water, whereas water spreads the flames of mineral and various other oils.

WHAT AMERICA IS DOING.

So much for Germany. As to the prospects of alcohol in America, I quote a few lines from the work "Distillation of Alcohol and De-naturing," by F. B. Wright, Spon & Chamberlain, New York, U.S.A.:—"While England and France are behind Germany in fostering this industry, yet they are far ahead of the United States in this matter. De-natured alcohol could be readily gotten in these countries for industrial purposes, while the United States continued to charge a high internal revenue tax on all but wood-alcohol. This prevented the use of alcohol in competition with gasoline or kerosene and limited its use in arts and manufactures. On June 7th, however, Congress passed the "De-naturing Act," as it is called, which provided in brief that alcohol, which had been mixed with a certain proportion of de-naturing materials sufficient to prevent its use as a beverage, should not be taxed. The passage of this Act was alcohol's new day, and is destined to have a wide influence upon the agricultural pursuits of the country. In the matter of small engines and motors alone one estimate places the farm use of these at three hundred thousand, with an annual increase of one hundred thousand. This means an economical displacing of horse and muscular work almost beyond comprehension. If now the farmer can make from surplus or cheaply grown crops the very alcohol which is to furnish the cheaper fuel for his motors, he is placed in a still more independent and commanding position in the industrial race. . . The wisdom of the German system, established by the law of 1887, has long ceased to be a question of debate. For every reichsmark of revenue sacrificed by exempting de-natured spirits from taxation the empire and its people have profited tenfold by the stimulus which has thereby been given to agriculture and the industrial arts."

DE-NATURING.

Now for a few words as to the de-naturing. That de-naturing can be effectively done may be taken as granted or the sale of de-natured alcohol would not be permitted for all Governments depend for income largely on the taxes imposed upon alcohol for drinking purposes. In that direction there exists practically no danger. With only methyl added it is true there have been individual cases of drinking the horrible mixture, but such rare cases can be safely ignored. Drink-maniacs have been known in some instances to imbibe naphtha, turpentine, and other abominable liquids. Pyradin is another chemical for de-naturing, and this imparts to alcohol an inconceivably disgusting flavour. Owing to a happy chance I had the opportunity of smelling this stuff, for during my visit the Excise Officer arrived on duty. The most cautious inhalation not only gave a feeling of nausea but caught the throat with a constrictive sensation. This de-naturant has recently been adopted by the

Natal authorities. With alcohol de-natured according to the chemical knowledge of the day there can be no danger among any people of its being used as or converted into a beverage. Such, at any rate, is the opinion in Europe and the United States.

HOW TO CREATE THE INDUSTRY.

To make the industry flourish in Natal as it should, it appears to me that there are two things requisite: business enterprise and abolition of the restrictions on the sale of the de-natured spirit. The business enterprise would lie in the bringing under the notice of the public the advantages of industrial alcohol as a cheaper and otherwise preferable substitute for paraffin, petrol, etc. Agents for the sale of the liquid, lamps, etc., from whom all information could be obtained should be established in the bigger towns. These agents should show motors at work and lamps burning. Demonstrations should also be given at the principal agricultural shows of this and the neighbouring Colonies. This business would have to be promoted and perhaps backed by the owners of sugar estates. As to the question of restrictions on the sale of de-natured spirits, this is what Mr. Wilkinson said:—"The restrictions hamper and almost kill the trade; if I get an order for de-natured spirits, say from a chemist, I must find out whether he has a license for selling the stuff. I am of opinion that the retailer should not be called upon to obtain a license and that the distiller should not be required to ascertain whether he, the customer, is in proper possession of such a license. Then, again, if you were to buy even a gallon or two of the stuff from a license-holder you might at any time be called on to explain to the satisfaction of the authorities how you were using the stuff. The de-naturing is done by an official, and as soon as the stuff is passed by the official as de-natured, that is to say, as a stuff unsaleable in any way for drinking, but of the very highest quality for industrial and illuminating purposes, then the selling of it should be no more impeded than if it were tea, mealies, milk, or coal. Of de-natured spirits less than ninety thousand gallons was produced last year; the sugar output per year, which is on the increase, is about 30,000 tons, and from the residue of molasses of every ton manufactured thirty gallons of 60 over proof spirit can be obtained. If this residue of molasses were distilled Natal would produce a million gallons yearly—which at 1s. per gallon would mean £50,000 per annum."

Such were the views of Mr. Wilkinson, and among my acquaintances interested in the sugar industry to whom I have broached the subject they receive full confirmation. With the other side of the question, the superiority of alcohol compared with paraffin for heating and illumination, I have already dealt. The industry is natural to the conditions of the Colony. It requires no petting and nursing; give it the fairplay it receives elsewhere and apparently the success it deserves will inevitably attend it.

VALE.

This is my last contribution to the *Journal*. All who have helped me with my work, now in its tenth year, and especially those whom I have "interviewed," I ask to accept my warmest thanks. Those whom I have interviewed, in receiving me as a fellow-farmer, never, in any instance, withheld information which I said might be of use to others engaged in farming. Their kindly hospitality and their readiness to help me I shall always remember.

The Cultivation of the Orange.

By Henry S. Dwyer.

The Orange, *Citrus aurantium,* as the name denotes, belongs to the Citrus family, and is, together with several other species, extensively cultivated on account of the commercial value of its fruit. It is supposed to be indigenous to South-Eastern Asia, but has now spread to, and is cultivated in, all the warmer parts of the world.

The fruit of the Orange was originally a small bitter berry, consisting for the most part of skin and seeds, and has been brought to its present state of perfection chiefly by means of carefully and judiciously selecting seed from the best fruits. Improvements have also been effected by cross-pollination with other species of the Citrus family, as, for instance, the Citron and the Lime; and in the case of Blood Oranges the crimson splashes and tints in the flesh are supposed to be due to a remote crossing with the red Shaddock. We also find that when trees are transported from one country to another the altered climatic conditions, and change of soil, sometimes exert an influence on the fruit and times of ripening. It is also claimed that double-working (budding) has improved the flavour of the orange; and it doubtless tends towards the elimination of thorn, and, probably, seed. Of late years, the Experiment Stations in various parts of the world, improved methods of cultivation, and chemical fertilisers, have all played an important part in the improvement of, not only citrus, but every class of fruit.

PROPAGATION.

The orange is propagated chiefly from seed, which is best sown in tins (paraffin tins cut into two) or shallow boxes; as if sown in seedbeds they are apt to throw out a long tap-root at the expense of the side roots, which is by no means desirable. Hessian screens should be erected over the seed-tins to protect the young plants from the fierce rays of the sun, and in dry weather they should be frequently watered, otherwise they are liable to receive a check. The following spring they should be planted out in nursery rows three feet apart, and trees about twelve inches in the rows, which will give plenty of room to work when budding. In the event of a grower preferring seedlings to worked trees, it would be advisable to specially select the seed; only taking it from desirable fruit growing at some distance from other citrus trees, in order to avoid any variations caused through cross-pollination.

The orange may also be propagated by means of layers and cuttings, or by baring and exposing portions of the larger roots, which forces a dormant bud into growth, and so a new tree is formed.

BUDDING.

Citrus trees may be grafted, but budding is preferred on account of being a much more easily performed, and therefore a quicker mode, of propagating varieties. It is performed in exactly the same manner as for other fruits, except that it is advisable to make the cross-cut on the stock below the vertical one, thus— ⊥ ; in which case the bud is pushed upwards. This is done to prevent water (rain) entering between the bark and the wood, thereby destroying the bud. When the bud has been inserted bind well above and below it with bandages dipped in melted wax, in the manufacture of which no fatty or oily substance has been used, as this is liable to cause the sap to sour in hot weather. Some writers state that when cross-pollination takes place a few buds immediately behind the blossom are temporarily influenced by the strange pollen; therefore, in order to avoid this, it would be better to select the bud from a vigorous, non-bearing branch.

STOCKS.

The question as to which is the best stock to use is one that lends itself to a great deal of discussion, and opens up a large field for the Experimenter, as an ideal stock in one locality may be a most dismal failure in another. I will briefly outline an experiment which would, in my opinion, settle the following points, viz.:—

1. The merits of the different stocks as disease resisters in various parts of the Colony.
2. The influence of stocks on the vigour and productiveness of trees.
3. The influence (if any) of stocks on size, flavour, etc., of fruit.
4. To test the keeping and carrying qualities of fruit from various stocks.
5. The addition to the set of a seedling of the same variety, thereby obtaining data as to the relative merits of budded trees, versus seedlings, etc., etc.

The experiment to be run somewhat on these lines. Let a good variety of orange be worked into sets of, say, half a dozen different citrus stocks; this work being done at the Government Experiment Orchards. These sets, with the addition of a seedling of the same variety, to be distributed, when ready, free of cost to one fruit-grower in each of the orange-growing districts of the Colony, such person to be nominated by the Fruit Growers Association, or the Agricultural Society of the district.

By so doing we would enlist the sympathy of those most interested in the work, and there is no doubt that, with a number of farmers, one practical demonstration of this description would prove more convincing than chapters of the most conclusive proofs written in regard to experiments conducted at a distance. There would, of course, be certain conditions and details connected with such an experiment, which need not be gone into at the present time.

Reverting to the subject of stocks, the experience of America and Australia seems to prove that the sour orange is the most resistant to such diseases as the gumming disease (Mal-de-Gomma) and die-back, but even this stock will not thrive on poor, unretentive soils subject to droughts, whilst the sweet orange, *C. aurantium*, and the Lemon, *C. limonum*, have proved most liable to the ravages of the above-mentioned diseases. Other stock used are the Shaddock, or Pummelo, *C. Decumana*, the Citron, *C. medica Cedra*, and the larger varieties of Lime, *C. medica acida*. Two very hardy species, *C. Otahieti*, and *C. trifoliata*, are sometimes used for dwarfing the orange.

Care should be taken, whilst the trees are in the nursery rows, to train them to a single stem, so as to form well-shaped trees, neither too lanky, nor yet branching, within an inch or two of the bud, as I have seen them sent out by nurserymen. It is a very simple matter to go along your rows and remove any shoots below the height you desire your tree to branch, and by so doing you will save both time and labour, and your trees a lot of unnecessary hacking.

Some nurserymen force the growth of their young trees by means of liberal doses of artificial fertilisers. This system cannot be denounced too severely, as when the trees are removed to a poorer soil, they receive a check, lose their healthy dark-green appearance, which is replaced by unhealthy foliage of a yellowish hue; and in this condition the tree falls an easy victim to any disease or insect pest which happens about.

PLANTING OUT.

Before the trees can be set out, it is necessary to peg off the land in such a manner as to have a peg marking the future position of each tree. The following method is as good as any, and if properly done will give straight rows, not only at right angles to one another, but also diagonally. It will be desirable to take a road or fence as a guide in pegging off your base line. Measure off equal distances from the fence at each end of the field, and drive in stakes, then between these stakes stretch a cord or line previously marked off into proper distances, say 20 feet, by sewing or tying with pieces of coloured twine, and at each of these marks drive in a peg. The next thing required is to peg off another line at right angles to the base line; and to get a true right angle, proceed as follows:—

With your cord measure off 60 feet, as nearly at right angles to the base line as you can guess, putting in a peg every 20 feet, turn the cord round the 60 feet peg, which we will call the Peg A, and run it to the fourth peg, marking 80 feet along the base line, which will be known as Peg B.

If it is a true right angle the distance between these two Pegs A and B—which line forms the third side of the triangle—should be 100 feet; if not move the Peg A on the side line until it comes right. This line can then be extended as far as required, by sighting along the pegs already in position, after which it is a simple matter to fill in the square.

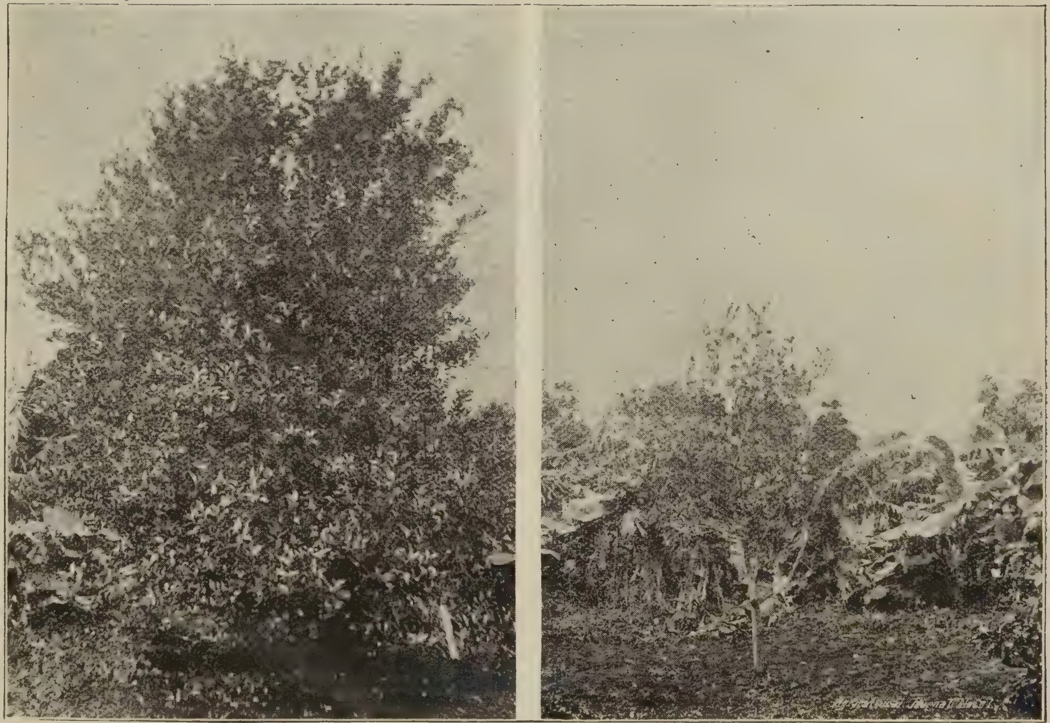
The field having been pegged off, it will then be necessary to have a planting board, by the use of which we are enabled to set the tree in its exact position, and thereby keep the rows intact. Take a piece of plank, say 5 feet 6 inches in length, in the middle cut out a small V shaped piece, and at equal distances from the centre of this V, say 2 feet 6 inches, bore a hole at each end of the board about 1 inch in diameter, or large enough to allow a peg to pass through freely. When about to plant, the board is placed so that the peg marking the position of the tree fits into the V, and two more pegs are driven through the holes, when you can shift plank, remove the middle peg, and dig the hole. Replace board over pegs, set your tree, and by bringing the trunks into the V, it will be in its exact position.

Orange trees, being evergreens, may be planted out at any time; but, in the Coastal districts, if planted during the winter, they should be watered periodically; whilst in up-country districts, I would advise earlier planting, so as to ensure the trees getting a good root-hold before the frosty weather commences.

In removing trees from the nursery, a number of the small fibrous roots, through which the plant food is assimilated, are bound to be severed, which will necessitate a shortening in of the tops; otherwise the area of leaf-surface, through which evaporation is constantly taking place, will be more than the reduced root-system can support.

The roots should be smoothed out evenly, all bruised or broken parts cut away, and have fine earth worked between them by hand, after which it is advisable to fill all interstices, and settle the earth around the roots by watering freely. Great care should be taken that the roots of the trees are not left exposed to the drying influences of the sun or wind. Never set your trees lower than they originally stood in the nursery, it being better to err on the other side, especially in well-watered localities.

The next thing to be considered is, at what distance apart orange trees do best. In this one must be guided, to a great extent, by the class of stock used; a dwarf stock, for instance, produces a much smaller



PRUNING CITRUS TREES.

Correct. incorrect.

tree than would the lemon or sweet orange, therefore the latter would require much more space than the former. If worked on dwarf stocks sixteen feet will, I think, be found ample; whilst trees on other stocks, and seedlings, should be set out from 22 feet to 30 feet each way, it being better, in my opinion, to give them too much rather than too little room. A grower, in considering this question, should also be influenced by the quality of his soil, it being obvious that a rich, well-drained soil will produce a larger tree than a poor, sodden soil.

PRUNING.

If they have been well cared for whilst in the nursery, the result will be trees with compact, well-shaped heads, consisting usually of three or four shoots on a single stem, the bottom shoot being 12 inches to 15 inches from the ground. With a tree of this description very little pruning will be necessary, beyond removing water-shoots, or long thorns liable to puncture the fruit, cutting out crossed, or crowded, branches, and all dead wood. Some vigorous growing varieties have a tendency to form a dense mass of foliage towards the centre of the tree, thereby shutting out the light, preventing free circulation of air, and affording an ideal hiding-place for pests and diseases. In this case it is necessary to resort to thinning out, by removing enough of the young shoots to admit light and air, and free entry of sprays to the centre of the tree. Although the orange can be cut back severely, it is only done in exceptional cases, therefore as long as the tree is growing and bearing well, it is better to leave well alone, and use the knife sparingly.

SOIL AND CULTIVATION.

The orange will grow on almost any class of soil, provided, of course, that it is not swampy. On light sandy soils it will bear for a few years, after which the growth becomes less vigorous, plainly showing that the supply of plant food is becoming exhausted, and requires replenishing; whilst on heavier loamy soils it has a much longer life. In one of the largest and best orange-growing districts known to the writer, the soil varied from a good, gravelly loam to a strong loam overlying a gravelly subsoil, and the healthy dark-green foliage, and heavy crops of fruit, borne by the trees was convincing proof that this class of soil is one of the best for oranges. The gravelly subsoil, in this case, ensured perfect drainage, which is one of the essential requirements in successful fruit-culture, as trees cannot possibly thrive with stagnant water lying about their roots. The orange likes plenty of moisture, but the water in the soil must not be allowed to stagnate, but kept moving by means of either natural, or artificial, drainage.

Before planting an orange grove the land should be ploughed 12 inches to 15 inches deep, which may be done by a second plough following in the furrow made by the first, or by stirring to the required depth with a subsoil plough. By so doing the under soil is opened up to the sweetening influences of the air, retains its moisture better by breaking up the capillary tubes at a lower level, and encourages the tree to send down its roots, instead of forming a mass of surface roots, as is the case with shallow cultivation on stiff soils. These surface roots interfere with, and are being constantly severed by, the tines of the cultivator, and in hot countries, subject to spells of dry weather, are liable to be dried out with most disastrous results to the tree.

Having ploughed deeply, it will be necessary to bring the soil to a fine state of tilth by the use of disc-harrows, harrows, etc., so as to ensure a sufficiency of fine earth to work in between the roots of the young tree, which would otherwise be better left unplanted. The after cultivation will consist of ploughing once a year (preferably in the winter when the trees are dormant), and is best done with a light pony plough, care being taken to have a narrow whipple-tree, and so prevent damage to the trees. During the growing period it will be necessary to keep down grass and weeds, and keep the surface of the soil well stirred by the frequent use of a cultivator. On light sandy ridges in districts frequently subject to very strong winds and heavy storms—such as the Coastal districts of Natal—growers may find it advantageous to allow grass to grow between the trees. On steep slopes, where the surface soil is kept loose by constant cultivation, these storms remove tons of earth and wash out deep gutters; and in dry weather the loose sand picked up by the wind has a defoliating effect on the trees. Such has been my experience with trees and vines at Winkel Spruit, but, since allowing these wind-swept slopes to revert to grass—which is cut periodically—the trees are making splendid growth. This cut grass forms a mat of decaying vegetable matter on the surface of the soil, which, when ploughed in, adds humus, and tends to give more body to the soil manuring.

One cannot reasonably expect land, from which heavy crops of fruit are harvested year after year, to retain its fertility and continue productive unless the elements taken up as plant food and used in the growth of the tree and production of such crops are restored to the soil in the form of fertilisers. The science of Chemistry, as applied to agriculture, has rendered great service in finding out what these elements are and in what percentage they are taken up by the various crops. From analyses by Mr. G. E. Colby, of the University of California, I take the following:—"The total ash from 1,000lbs. of fresh fruit (oranges) was 4·32lbs., equal to 2·11lbs. of Potash, ·97lbs. of Lime, ·53lbs. of Phosphoric Acid, and 1·83lbs. of Nitrogen." Thus, by means of this analysis, we are enabled to compute approximately the weight of these materials actually transported from the orchard soil in our orange crop.

Then from the results of experiments conducted in America we glean the following:—

1. That potash used in excess tends toward the production of sour fruit with thick tough rind.

2. That phosphates are supposed to increase and hasten the bearing capabilities of the tree, and rectify the acidulous properties imparted by the potash.

3. That organic nitrogenous manures, *i.e.*, those obtained from the decomposition of animal or vegetable matter, if used at all, would be better applied in light dressings, as otherwise thick-skinned, insipid fruit and a rank, unhealthy forced growth of wood are produced; and in this state the tree is unable to withstand attacks of pests and diseases, and that it is, therefore, preferable to use the inorganic or mineral forms of Nitrogen, such as Sulphate of Ammonia or Nitrate of Soda.

Thus, a well-balanced admixture of commercial fertilisers, in the proportions indicated by an analysis of the soil to which it is to be applied, and the requirements of the crop to be produced, will undoubtedly give the best results.

Soluble manure may be broadcasted through the orchard, or well worked into the soil in the vicinity of the trees; but insoluble manure should be sown in a trench nine or ten inches deep, dug a few feet from the trunk of the tree (the distance varying according to the age of the tree). The reason for this is that the effects of insoluble manures (take, for instance, coarsely ground bone meal) will remain in the soil for years, and if not sown deeply will encourage the growth of a network of roots near the surface of the soil, which, for reasons already stated, is undesirable.

INSECT PESTS AND DISEASES.

Most, if not all, of the pests and diseases attacking citrus fruits in Natal have been fully dealt with by the Government Entomologist in his Bulletins and the *Journal*, and anyone requiring further information on this subject would do well to write, also sending specimens, to the abovementioned gentleman, Department of Agriculture, Pietermaritzburg.

VARIETIES.

When planting it would be advisable to select both early and late ripening varieties, so as to obtain succession crops. This gives more time for proper handling in harvesting and marketing, and obviates the necessity of having to place the whole of the crop on, may be, a glutted market. There are a large number of varieties to choose from, and they are continually being increased by the addition of seedlings of special merit.

The chief points to be considered in choosing varieties are:—

1. Tree to be a vigorous grower and good cropper.

2. Fruit, medium to large in size; skin thin, smooth and of showy appearance; flesh solid, melting and juicy, with few seeds; flavour a fine blending of saccharine and acidulous properties, neither insipidly sweet like some varieties of the sweet China family, or with vinous properties too strongly marked, as is the tendency in some varieties of the Portugal family.

3. In view of the bright prospects of a successful export trade, it is essential that only such varieties as are good keepers and shippers be selected.

Although it is well nigh impossible to get an orange perfect in every detail, still, I think, in the main the following varieties meet the above-mentioned requirements, viz.:—Maltese Blood, Parramatta, Homosassa, Magnum Bonum, Parson Brown, and Whitaker, which ripen fairly early, and Mediterranean Sweet, Jaffa, Valencia Late, Hart's Late, and Peerless, which are late ripening varieties.

The Seville, or Bitter Orange, is also grown extensively, the fruit being largely used in the manufacture of marmalade.

THE NAVEL ORANGE.

This orange was originally imported from Brazil by the United States Department of Agriculture, and has since spread to every part of the world, suitable for orange-growing, under the name of Washington Navel, or Bahia. The fruit is large, with smooth, silky skin; flesh solid, juicy, of delicious flavour; and is free from seeds, and a good keeper. These good points all combine to make it about the best orange cultivated. The Navel orange would undoubtedly be grown far more extensively but for the fact that they are inclined to be shy bearers, and require a rich, open, well-drained soil. There are a number of sub-varieties, all differing slightly from the type. In the Australian, for instance, the Navel is much larger. Most of them blossom freely, and set their fruit, but it falls off when quite small, and, though in some localities they grow satisfactorily, in others the crop is too light to be payable.

THE MANDARIN ORANGE, CITRUS NOBILIS.

This seems to be a distinct family, and is also supposed to be indigenous to South-Eastern Asia. The fruit is flattened, segments easily detached surrounding a hollow centre; skin smooth, of fine texture, and when ripe loosely adhering; flesh of delicate flavour, juicy and melting; but when over-ripe is inclined to become dry and fibrous.

The Tangerine is another section of *Citrus nobilis*, which closely resembles the Mandarin, the main difference being in the colour of the fruit, which, in the latter is yellow, whilst in the former it is more of a reddish hue.

HARVESTING AND MARKETING.

The care bestowed on the fruit from the time it leaves the tree has a greater influence on the keeping qualities than is apparent to the casual observer, and on it depends the success, or failure, of the shipment, more especially with regard to fruit intended for a distant market.

The exact degree of ripeness at which to gather oranges will soon be found out from experience by an observant grower. If it is intended for shipping to a distant market the fruit may be picked as soon as the rind has coloured evenly, and before it is fully ripe; whilst for the local market it is better to allow it to hang longer and more fully mature. Fruit affected by scale, or defective otherwise, should never be sent to the English market. Badly bruised, or punctured fruit, should on no account be mixed with good, sound fruit, as the former will quickly decay, and the gases, etc., given off in decomposition will probably damage the latter.

Fruit should never be pulled, on account of the liability to rupture the skin, which causes decay, but should be cut off, leaving about one quarter of an inch of the stalk on the fruit. This is best done by means of proper lemon clippers, there being a danger of cutting, or graving, the fruit when a knife is used. Each fruit as it is clipped off should be carefully deposited (not thrown or dropped) in handy-sized cloth-lined baskets, having a hook attached so that it can be hung on the rungs of the ladder, thereby allowing free use of both hands for gathering. When full, the basket is taken down, and the fruit is transferred, singly, to the sweat-boxes, which are then removed to the packing-house, where the fruit undergoes a process of curing or sweating.

The rind of the orange contains a large number of small oil cells, which are very easily ruptured; and the object of sweating is to remove, by evaporation, sufficient of this oil, and other moisture, as to cause the rind to dry and soften slightly; also, to allow time for developing any defect in the fruit caused by bruising or rough handling. The time required for sweating will vary from about three days in fine bright weather to five or six in damp, muggy weather, and probably longer if the fruit has been gathered in the rain. The chambers should be well ventilated, and the boxes stored in such manner as to allow a current of air to freely circulate between them.

It sometimes happens when an orchard is situated alongside a main road the dust created by the traffic settles on the fruit, leaving it in a dirty condition; fruit of this description, also smutty fruit, should be well washed and *thoroughly* dried before packing.

When the fruit is ready for packing it should be graded—if not previously done in the orchard—for size, colour, and perhaps shape; and then each fruit should be wrapped in tissue paper, which gives a more finished appearance to the packing, and minimises the danger of sound fruit being damaged by an odd one decaying on the voyage. These wrapping papers are usually cut about 10 inches by 10 inches, and the operation is performed very expeditiously by laying the paper on the palm of the hand, then place the orange in the centre of the paper, gather up and wrap snugly round the fruit, finally twisting the ends round the stalk, thereby preventing any possibility of other fruit being punctured. Pack the fruit firmly and evenly into the cases, but not too tightly; and it would be better to allow the contents to project a little above the sides, so that when the lid is nailed down there will be no rattling or shaking. Another reason for this is, that with fruit kept for any length of time, there is always a shrinkage in the bulk caused by drying out, and spaces also occur through the decay of odd fruits. Only pack one size of fruit in each case, and in the event of a small space occurring fill it with wood-wool, but never try to crowd a smaller orange into it, as it would spoil the look, and probably the sale, of the whole case. Again, never countenance the foolish and dishonest practice of topping off your cases with superior fruit, as the brand of a grower doing this soon becomes known, and his fruit does not meet with a ready sale.

The cases should then be neatly stencilled with brands indicating the nature, number and grade of the contents, the name and address of the consignee, and the private mark or brand of the sender.

The question of cases would be best left in abeyance until the return of Mr. Sim, who will then be able to place us in possession of information regarding the class of case mostly favoured by the wholesale buyers on the English market, and when no doubt a standard size for Natal will be decided upon.

I see by the *Journal* for February, 1907, that the dimensions of the case recommended for immediate use are 24 inches by 12 inches by 8 inches. This is a nice, handy case, with an outside measurement of 2,304 cubic inches, which allows 30 cases to the shipping ton of 40 cubic feet.

I also notice that Mr. Anderson makes no mention of a central division in these cases, which I think will be found necessary for the following reasons:—

1. Quarter inch material with a two feet span will, I think, be found too frail for the weight of the fruit, and therefore liable to break or tear away in handling, slinging, etc.

2. The weight of the fruit, in causing the boards to sag, affords space and allows the fruit to move.

3. If a number of these cases are stacked one on top of the other, I think it probable there will be too much weight on the fruit in or about the centre of the bottom cases.

With regard to unmarketable damaged fruit, this may be used in the manufacture of citric acid, etc., but should be dealt with by a Co-operative Fruit-growers Association rather than individual growers.

The *Practical Farmer* gives this method of selecting calves to raise, which is allowed by many successful dairymen: Turn the little calf on its back and see that it has four well placed teats, that is, wide apart, and two rudimentaries, or extra teats. Next see that it has a large udder cord which you can feel on the side, rubbing the finger back and forth. Such parts are made in proportion, and a large udder cord indicates that the calf when it becomes a cow will carry a large udder, because a large cord is necessary to hold this up. Next look in the calf's mouth, and if there are eight teeth well through you can safely raise that calf. If there are only two teeth put through reject the calf, because, as a rule, this indicates the constitutional vigour of the mother was not sufficient to mature the calf fully before it was born. Such a calf will be likely to have a weak vitality when it grows up, as well as during its younger days.

Export of Natal Fruit.

About the middle of February a cable was despatched to the Agent-General in London requesting that 15,000 cases for naartjes and 4,000 for oranges, together with a sufficiency of wood-wool and wrappers, might be obtained and forwarded to Natal.

The Minister of Agriculture has now received communications from the Agent-General relative to these cases and to the packing of fruit generally.

An order for the 19,000 cases has been placed with a leading firm in London, and the Agent-General reports, under date 1st March, that the whole order would be filled in three weeks' time, the boxes being sent in three weekly shipments.

Sir William Arbuckle's communication contains some interesting suggestions and recommendations. He has had several interviews with experts in the fruit trade, some of whom favour the idea of dividing fruit boxes in two by a wooden partition, whilst others are adverse to the suggestion. In the boxes which are being sent no partitions have been inserted.

The Agent-General suggests the first shipment of fruit should consist of one-half packed in partitioned and one-half in non-partitioned boxes.

Citrus fruit cases are of two descriptions—closed and ventilated. A considerable proportion of the fruit from the Cape is placed in closed cases, but citrus fruits from the Mediterranean arrive in London mostly in cases with a space for ventilation of about a quarter of an inch between the boards forming the sides. The Agent-General has therefore given instructions for a space of about a quarter of an inch to be left between the boards forming the lid and bottom in the boxes which are being consigned to Natal.

Dealing with the question of fruit boxes, the Agent-General has come to the conclusion that it would be preferable if boxes could be manufactured in Natal. The cost and freight of imported cases are two heavy items, which materially add to the price of the fruit delivered in England. Sir William considers that, unless the boxes can be made locally, Natal fruit-growers will be considerably handicapped in their competition with Mediterranean and other fruit. It is understood that Cape Colony is discontinuing the importation of English-made fruit-boxes, and is making them locally from poplar wood.

Appearance is the greatest factor in determining the value of fruit in the English market; and Sir William Arbuckle suggests that future supplies of wrappers should be stamped with the Natal Arms, in order to give the fruit an attractive look. He has forwarded a specimen of a silver-leaf wrapper which is extensively used for boxes of 50 tangerines intended for the Christmas market, and Sir William is of opinion that boxes of 50 or 100 packed in a similar wrapper (over the ordinary paper wrapper) would prove more tempting to the purchaser than those bearing paper wrappers with simply the words "Natal Fruit" on them.

In conclusion, the Agent-General emphasises the necessity for despatching only carefully selected fruit, and for grading and packing the fruit in the most tasteful manner, so as to appeal to the English purchaser.

The South African Exhibition.

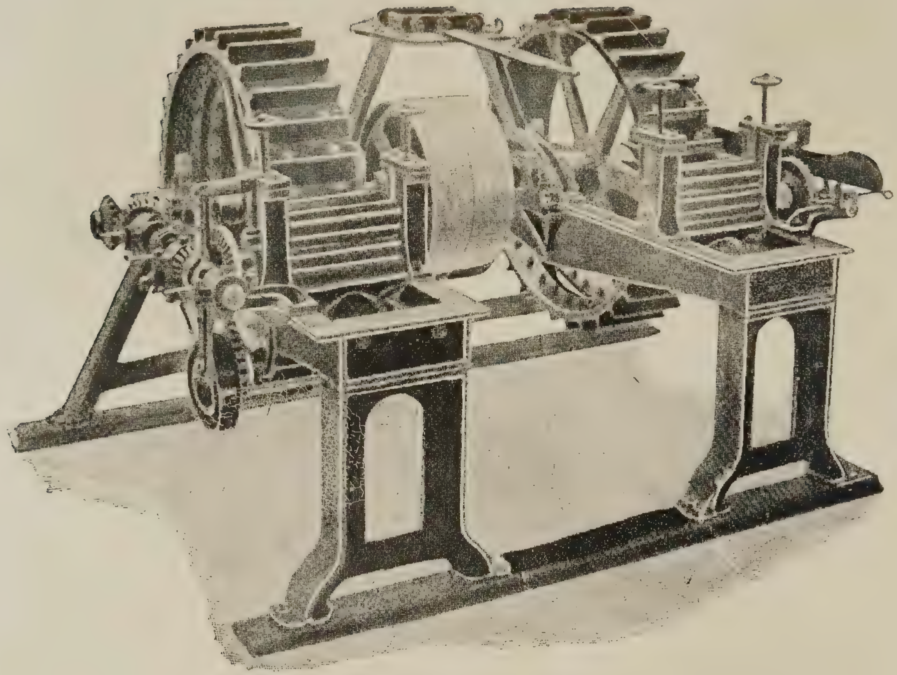
NATAL'S POSITION.

Natal has come well to the fore in the South African Exhibition, and her various products have attracted much attention. The Agent-General states that he is receiving several letters day by day from important firms interested in the tea and fruit trades. There have also been many enquiries at the Exhibition itself after Natal products.

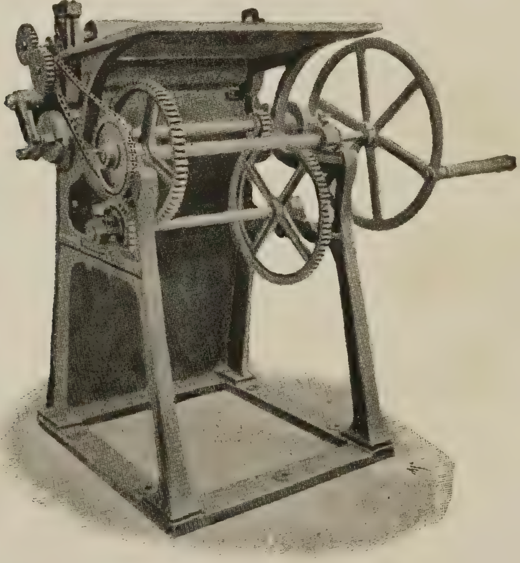
A considerable quantity of our produce has been sold, particularly pineapples. At the Exhibition every endeavour was made to let visitors test the flavour of the Natal pineapple. "Everyone who tastes it," remarked Mr. T. R. Sim to a *South Africa* representative, "remarks upon the luscious quality of the fruit, which, despite its small size, possesses a delicacy of flavour that is not met with in any other variety. It has often occurred to me that our little Natal pineapple is exactly suited for bottling purposes, and the preservers might do worse than consider the bottling of pineapples from Natal here, the price admitting, as it does, of such treatment."

Natal jams are pronounced by one newspaper to be "exquisite" in flavour. "There are no better jams made than Cape gooseberry, amatungula (an indigenous berry), pineapple, or guava," it is stated. The same paper speaks of "the famous Natal tea, which is scarcely distinguishable from Ceylon, and is quite as good in quality and flavour" (and yet there are many Natalians who will have none but the imported article!).

The Agent-General, in a letter to the Colonial Secretary, writes: "Their Majesties the King and Queen not only expressed their personal appreciation to Sir Peter Bam of the Exhibition and the arrangements on the opening day, but Lord Knollys has sent a special letter, by direction, reiterating their sentiments. The King and Queen and other members of the Royal Family made a close inspection of our exhibits under the guidance of Mr. Russell, Mr. Sim and myself, and expressed their appreciation of everything they saw."



DOUBLE RASPADOR WITH LATEST IMPROVEMENTS.
Wheel guards not shown.
See Article on "Fibre," by C. Rositzky in last month's issue of the *Journal.*)



RAMIE DECORTICATOR.
(See Article on "Fibre," by C. Rositzky, in last month's issue of the *Journal.*)

Fibre Cultivation.

(A summary of Farmers' Bulletin No. 13, Department of the Interior, Bureau of Agriculture, Manila.)

A Bulletin recently issued by Mr. H. T. Edwards, Fibre Expert, on "The Cultivation of Maguey in the Philippine Islands" gives much valuable information regarding fibre cultivation generally, which should be studied by those in Natal interested in that industry.

The maguey plant of the Phillipine Islands, the fibre of which is known in Great Britain as Manila aloe and in the United States as Philippine maguey, and the henequin plant of Yucatan, which produces the sisal hemp of commerce, are closely allied species of the genus *Agave.* These two plants have the same habits and growth and are propagated and cultivated by the same methods. The fibre-extracting machines that are used for sisal can be used also for maguey.

The conditions which prevail in many parts of the Philippine Islands, and to which the maguey industry is peculiarly adaptable, are: A long dry season; large areas of arid, impoverished land; a limited supply of draft animals; the prevalence of insect pests and plant diseases; labour that is unaccustomed to the care of crops requiring intensive cultivation; and insufficient capital for the purchase of animals, implements and machinery. In the cultivation of maguey, these conditions are met with a plant that grows and flourishes through the longest periods of drought; that requires for its best development a thin, rocky, limestone, or coral soil, and which can be grown in beach sand; that can be produced on small farms without the use of a single animal; that is not seriously injured by any insect or plant disease; and that needs only a yearly, or semi-yearly, cultivation.

The production of sisal hemp has, within a comparatively few years, made Yucatan one of the richest States in the Republic of Mexico. The wonderful development of this industry is indicated by the imports of sisal hemp into the United States, which were, in 1894, 48,468 tons, valued at £779,598; and, in 1904, 109,214 tons, valued at £3,319,907, an increase in value of 328 per cent. in ten years.

The fibre of the henequin or sisal hemp plant has been utilised in Yucatan for centuries, but only within comparatively recent years has it become an article of commercial importance. The industry is supposed to have been started in Yucatan by the Toltecs about A.D. 1060. In 1783 a Commission appointed by the Royal Spanish Navy investigated this fibre and reported favourably concerning it. In 1839 an association was formed in Yucatan to promote the cultivation of henequin, but, owing to the fact that at this time all of the fibre produced was extracted by the use of crude, wooden implements, the industry was not a profitable one. Realising the need of a fibre-extracting machine for henequin, the State Government offered a reward of 10,000 Mexican dollars (a little over £1,000) to the invention of a satisfactory machine. This offer resulted in the invention of the "raspador," from which have come the improved, automatic machines that have made the sisal industry what it is to-day. In 1875 the total export of sisal hemp from Yucatan was valued at £73,971. In 1900 it had increased to £2,355,840, and in 1904 it was £3,339,854.

From Yucatan, sisal hemp was introduced into Florida, the Bahama Islands, the Caicos Islands, Mauritius, the Hawaiian Islands, Cape Colony and Natal, West Africa, Australia, and India. In the Bahamas the sisal industry has attained considerble proportions, and is now firmly established. In Hawaii, 20,000 sisal plants were imported by the Commissioner of Agriculture and Forestry in 1893. Some years later the Hawaiian Fibre Company was formed, and it now has 850 acres of sisal under cultivation. It was estimated in 1903 that fully 10,000 acres of sisal had then been planted in Hawaii.

The henequin of Yucatan, *Agave rigida elongata*; the sisal of Hawaii, *Agave rigida sisalana*; and the maguey of the Philippine Islands, recently identified at the Royal Botanic Gardens, Kew, as *Agave cantula*, are very similar plants. All have the short, thick stem; the aloe-like cluster of large, fleshy leaves; and the tall flower stalk, or "pole," which bears a large number of small bulbils, or pole plants. The Hawaiian plant differs from that of Yucatan in having a shorter trunk; leaves smooth-edged, or bearing a few unequal teeth; and the fibre less in quantity, but superior in quality. The Philippine maguey plant has a short trunk; leaves from 4 to 6 feet long, from 2¾ inches wide at the base to 4 inches wide at middle, and about 1 inch thick at the base; lateral teeth three-fourths to 1¼ inches long apart; dark-brown terminal spine one-half inch long; and fibre finer, white, and longer, but less in quantity than either the Yucatan or the Hawaiian varieties.

The fibre of maguey is derived from the leaves, and is obtained by separating the pulpy portion of the leaf from the fine filaments, or fibro-vascular bundles, which run through this pulp. The fibre is white, or yellowish-white, in colour, 4 to 5 feet in length, fine and soft. Another marked quality is its elasticity, which gives it great value when used for cordage that is liable to be subjected to any sudden strain. In strength it is superior to coir, jute, sunn hemp, and Russian hemp.

Maguey requires neither a large, nor a continuous, supply of moisture, but rather an excess of hot, dry weather. It is evident, therefore, that the districts best adapted to the cultivation of maguey are those where there is a long dry season and a light rainfall. With an abundant supply of atmospheric moisture and a rich, moist soil, this plant will grow and flourish, but under these conditions the leaves develop a large amount of pulp and a small percentage of fibre. As the roots of the plant are very sensitive to an excess of moisture, it is most essential that the soil be well drained. Worn-out "provision" and pineapple fields appear to be well suited to its cultivation—and equally to the cultivation of sisal.

In preparing the land for planting, any underbush, or other growth, should be cut and burned during the dry season. As maguey feeds heavily upon potash, the ash that is left from this refuse will furnish valuable fertilising material.

Maguey is propagated in two ways—from the bulbils that are produced on the central flower stalk, and from the suckers which grow from the roots of the older plants. The latter system is more widely followed. When the plant is from twelve to eighteen months old, it commences to throw out underground runners. The point of one of these, on reaching the surface, forms a sucker or shoot. From 30 to 40 suckers are produced by one plant during the first three or four years of its life.

The suckers that are to be used for planting may either be taken from the old fields and set out at once in the new plantation, or they may be thrown in heaps and allowed to be in the sun for six or eight weeks. The suckers so treated are said to produce longer and stronger plants than where they are taken direct from one field to another.

In planting, the distance between the rows and plants must not be too little, as many leaves are thereby torn and lacerated by the spines of adjoining plants, and the work of cultivation and harvesting is rendered extremely difficult. On the other hand, where the distance is too great, there is unnecessary waste of land. After long experience, the Yucatan planters have generally adopted the row system, with plants 4½ feet apart in the row and rows 12 feet.

Mr. Edwards states that it was at one time the almost universal custom of Philippine planters to set out maguey plants 2 or 3 feet apart; but that on the Yutacan sisal plantations it had been thoroughly demonstrated that planting in rows 12 feet apart with plants 4½ feet apart in the rows gave more fibre per acre and fibre of better quality than where the plants were set out closer together. The Philippine planter also frequently commenced cutting when the plants were but 2 or 2½ years old. Following this first premature cutting, each year the plant was denuded of all but a few leaves. The system resulted in a weakened and stunted plant, and a considerable part of the immature leaves thus harvested contained but little fibre. The Yucatan system of cutting at one time only the mature leaves around the base of the plant keeps the plant always in vigorous condition and gives more and better fibre. Mr. Edwards states that with a more careful selection of suckers for planting, a better system of cultivation, and more judicious cropping, it is only reasonable to expect that the plant will be improved.

It has been thoroughly demonstrated that this system of planting will give more fibre per acre and fibre of better quality than when the plants are set out closer together. The advantages of the row system are that it facilitates cultivation, admits air and sunlight, which are necessary to harden and strengthen the fibre, expedites the work of cutting and handling the leaves, and gives room for replanting when the old plants are approaching maturity.

A maguey field, after it is once well established, requires but comparatively little attention and cultivation. When the suckers have been set out with reasonable care, the loss will be small. Two or three times a year the fields should be cleaned of weeds and grass, care being taken not to bruise the leaves of the growing plants, as any such injury will result in a discolouration of the fibre. Suckers will begin to grow from the roots of the old plants in from twelve to eighteen months, and such as are not required for setting new fields should be removed and thrown away. The growth of a large number of suckers on any one plant not only lessens the vitality of the plant but also tends to hasten the growth of the pole.

As maguey fields give no return for three or four years, it is sometimes desirable, while the plants are small, to cultivate another crop on the same land. The practicability of doing this will depend largely on the nature of the soil, maguey frequently being grown on land that will produce no other crop.

According to the *Kew Bulletin*, 1892, at the Grenada Botanical Station, in the Windward Islands, one-half of a sisal field was planted with maize. It was noticed that the small sisal plants shaded by the maize made far greater progress than those without shade.

In the Bahama Islands similar results have been obtained with both maize and cotton. These crops are not only beneficial in furnishing shade, but they also keep down the weeds, and yield a product of more or less value. Sweet potatoes, which are frequently planted in abaca fields, should not be planted with maguey, as the vines would soon entirely cover the small plants and retard their growth.

The early or late poling of the plant is a consideration upon which may depend the entire success or failure of the industry. It is essential with a crop that yields no return for from three to five years after planting, that it shall continue productive for a considerable number of years without replanting. In the case of maguey, the growth of the pole, which is soon followed by the death of the plant, is in part the result of natural conditions, and in part depends on the variety and care of the plant. The life of the Yucatan sisal plant, after the first cutting of leaves, is from ten to twenty-five years; while that of the Bahama plant is from five to eight years. The longer life of the Yucatan plant is due to difference in variety, climatic and soil conditions, and the more careful system of cropping of the Yucatan planters. A humid climate and a moist soil tend to bring on early poling. The careless cutting of leaves, and either long delay in cutting or over-cropping, have the same result. If the pole is lopped off as soon as it appears above the leaves, the life of the plant will be prolonged a year or more, allowing the leaves then on the plant to mature.

The number of years required for the production of the first cutting of leaves is variable, depending on the size and condition of the suckers when planted, subsequent climatic conditions, and on the nature of the soil. Ordinarily, the first crop of leaves will mature in three or four years. In Hawaii the first leaves are cut at three years from the time of planting in the field, or four years from the time of setting bulbils in the nursery. The Yucatan henequin requires from four to seven years to mature the first leaves.

It is customary to harvest maguey once a year, preferably during the dry season. In the wet season the leaves contain a smaller percentage of fibre, and the frequent rains interfere with the work of drying. Each plant should yield from 15 to 30 leaves annually. There is no fixed rule governing the time for cutting the leaves, and this matter is one to be determined largely by judgment and experience. Only those leaves should be cut which incline toward a horizontal position and show signs of maturity. As too much cutting will soon destroy the strongest of plants, constant care should be exercised against overcropping.

In Yucatan the harvesting of sisal is done principally by Indians, who do this work with "corbas," the corba being a bolo having a blade curved at the end. An average day's work is from 1,500 to 2,000 leaves. Following each cutter is a woman, or boy, who cuts off the thorny sides and end spine of the leaves, and makes them up into bundles of fifty. These bundles of leaves are carried out to the roads, and transported on small tramcars to the cleaning machine.

Maguey leaves should be cleaned within twenty-four hours after they were cut from the plant. If left for a longer period than this, the fibre will become discoloured at the ends.

An average leaf of maguey is from 4 to 6 feet long, weighs from one to two pounds, and is about one inch thick at the base. It consists of a mass of cellular tissue, through which run the fibro-vascular bundles, or fibres. The work of fibre-extraction consists in separating the pulpy portion of the leaf from these fine filaments. There are two general methods by which this end is accomplished. The leaf may be placed in water until the pulp becomes so rotten that it can be easily removed by washing and beating; or the leaf while still green may be treated to some scraping process that removes the pulp and leaves the cleaned fibre. The first of these processes, known as "retting," is slow, expensive, and results in the production of inferior fibre. On all the larger sisal plantations fibre-extracting machines are now used.

The leaf of sisal hemp is practically the same as the maguey, and can be cleaned by the same methods. Retting, however, has never been generally practised in the sisal-producing countries. Previous to the invention of a machine for extracting sisal, this fibre was cleaned in Yucatan by a scraping process. With the crude wooden implements which were used for this work, one man could clean only from 6 to 9 pounds of fibre daily.

The first machine used for cleaning sisal, which was the "raspador," was the invention of a Franciscan friar. This machine is still used to some extent, and all of the improved, automatic fibre-extracting machines that are used to-day for cleaning sisal and maguey are constructed on the same principle and are but improvements of this old machine.

The raspador consists of a 54-inch wheel which runs in a heavy wooden case. Across the 6-inch face of this wheel, about one foot apart, are placed brass scraping knives. The leaf is inserted through a hole in the case, being held by a clamp, and whips forward as the wheel moves around. A heavy curved block placed underneath is then, by means of a lever, brought to bear on the leaf, pressing it against the revolving wheel, which almost instantly crushes and scrapes away the pulp. The leaf is then withdrawn and the other end cleaned in the same manner.

On the sisal plantations the raspador has now been largely superseded by the "Prieto," the "Torroella," and other automatic machines, which clean from 50,000 to 150,000 leaves per day. When these machines are used, one-half of each day's cutting of leaves is reserved for the following day, so that the work of cleaning can commence in the early morning. The leaves are not, however, allowed to accumulate, as after twenty-four hours they begin to harden and are difficult to clean.

In cleaning with the improved automatic machines, the bundles of leaves are first placed on endless carriers, which take them up to the machine platform and drop them on the feed tables. The bundles are then broken and the leaves fed into the grip chains, which draw them into the machine. These machines have either two or three scraping wheels, similar to those of the raspador. On the grip chains the leaf is conveyed to the first scraping wheel, which instantly cleans one-half of it. It is then carried on to the second scraping wheel, and, in the case of the three-wheel machines, subsequently to the third wheel, which cleans the other half in a similar manner, the cleaned fibre being thrown out at the opposite end of the machine. One machinist is required to attend to the machine, one man to feed it, and two boys to receive and handle the fibre.

There are a number of different automatic fibre-extracting machines in quite general use in Yucatan. While each of these machines has its partisans, the "Prieto" appears to be in most general use. Ordinarily these machines do not clean up to their full capacity because of the ignorance of the labour used to operate them. The machines used in Yucatan, and the cost of each, are shown in the following table, prepared from a statement made by the American Consul in Merida:—

Hemp-cleaning Machines in Actual Use upon the Plantations in Yucatan.

	Number of leaves cleaned In ten hours.	Number of men needed,	Actual horse. power.	Cost of Machine.	
				U.S. currency. $	English currency. £
Lanaux reformed ...	150,000	4	25	3,003	625
Prieto reformed ...	150,000	4	16	3,689	768
Torroella reformed ...	100,000	4	16	3,003	625
Villamor reformed ...	100,000	7	16	2,145	446
Stephens	150,000	3	70	*	*
Solis	9,000	3	9	855	179

* No more being made.

The machine-cleaned maguey of Laoag is washed after it is taken from the machine, and is then dried in the sun. The sisal produced by the Hawaiian Fibre Company is washed as it passed through the machine. In Yucatan the fibre is not washed, but is taken from the machine, placed upon small trucks, and carried at once to the drying yards. In the yards the fibre is hung over galvanised-wire racks to dry in the sun. If allowed to remain any length of time after cleaning, without exposure to the sun, it will become dark and spotted. If exposed to rain or dew it loses its lustre. On one or two of the Yucatan plantations galvanised-iron piping is now used in place of wire, with satisfactory results. In Hawaii the wet fibre is taken from the machine and is laid on the ground to dry. While this method of drying gives a fibre that is straighter and, therefore, more easily handled in the baling press, its desirability is to be questioned.

When quite dry, the fibre is taken to the baling press, in which it should be laid straight without doubling over. On the smaller Yucatan plantations screw presses are used, and on the larger estates hydraulic presses. The weight of the Yucatan bales is variable, ranging from 14 to 16 arrobas, 350 to 400 pounds. The dimensions of a 15-arroba bale are 32 by 25 by 44 inches. Hawaiian sisal is put up in bales weighing 500 pounds, with dimensions of 54 by 30 by 30 inches. The bales are not covered, and are tied either with cheap rope or with twisted fibre. Practically all of the Philippine maguey fibre is shipped to Manila and baled on the abaca presses.

The annual yield per acre of maguey fibre will depend upon the number of plants to the acre, the number of leaves cut from each plant, the size and weight of these leaves, and the percentage of fibre which they contain. These several factors are so variable, even on a well-organised plantation, that variations in the estimates of fibre yield are found. On two adjoining plantations, where conditions are apparently the same, quite different results may be obtained. The estimates made by authorities and by planters as to the average yield of sisal per acre range from 400 to 1,500 pounds.

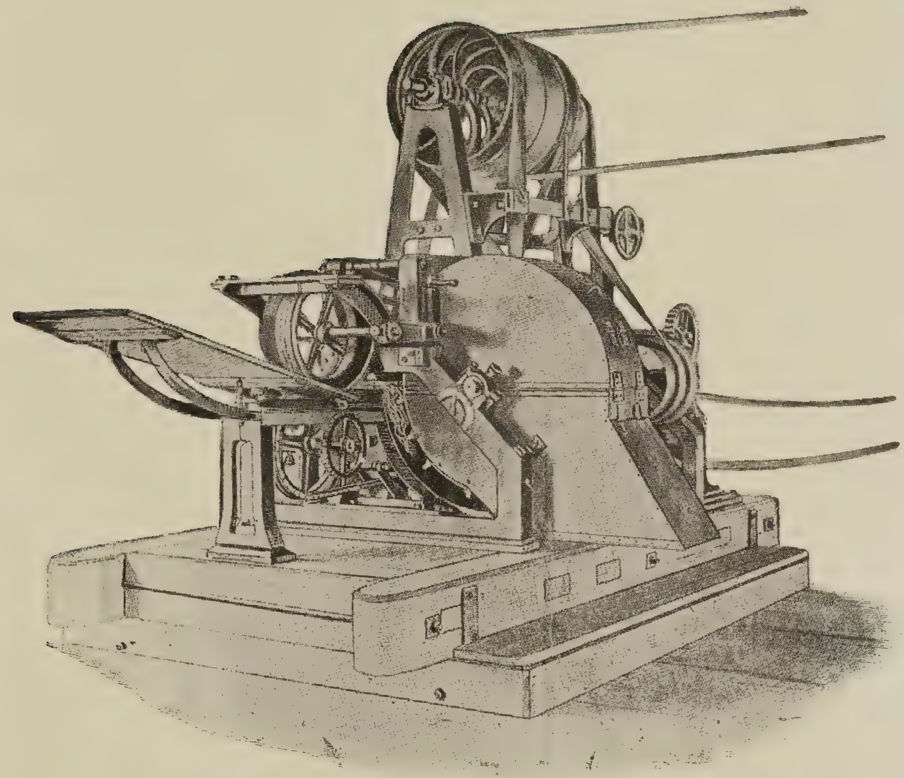
The yield of maguey is considerably less than that of sisal. This is due in part to the difference between the Yucatan and the Philippine plant and fibre; and, also, to the more highly developed system of cultivation of the Yucatan planters. Maguey fibre is finer than sisal, and from a given weight of leaves smaller percentage in weight of fibre is obtained than in Yucatan. With respect to cultivation, the close planting and over-cropping so commonly practised by maguey planters in the Philippines, result in the production of many small and undeveloped leaves.

In Yucatan it is generally estimated that 82 plants will give an annual yield of 100 pounds of fibre. On this basis, with plants set at 4½ by 12 feet apart, or, approximately, 800 to one acre, the fibre yield per acre would be 975 pounds. Under average conditions, each plant should yield annually from 15 to 30 leaves, giving a total of from 12,000 to 24,000 leaves per acre. The fibre yield is, ordinarily, about 50 pounds per thousand leaves. The fibre yield from 12,000 leaves, at 50 pounds per thousand, is 600 pounds; and from 24,000 leaves, at 50 pounds per thousand, 1,200 pounds, or an average of 900 pounds of fibre per acre.

The following table, showing the results of experiments made by Dr. Charles Richards Dodge in Yucatan, indicates the average weight of leaves and the percentage of fibre which they contain:—

Lot.	Age. Years.	Weight, 10 leaves. Pounds.	Fibre Yield. Per cent.
1	5	20	3·27
2	10	10	5·57
3	10	15½	5·92
4	15	8¾	7·67
5	15	14	5·64
6	30	8	6·87
7	32	15	5·88
8	7	21¼	4·45

Samples of maguey forwarded to London in October, 1905, were quoted at £30 per ton, the London quotation for sisal on the same date being £37. Machine-cleaned maguey fibre forwarded to fibre brokers in New York City, in 1905, was reported to have approximately the same value as sisal. The usual New York quotations for No. 1 hand-



FIBRE MACHINERY.—"LA CORONA."

(See Article on "Fibre," by C. Rositzky, in last month's issue of the *Journal.*)

cleaned maguey are from one-half to three-fourths of a cent less per pound than for Yucatan sisal.

The following New York quotations for sisal hemp and for "Fair Current" Manila indicate the relative value of Manila hemp and good machine-cleaned maguey:—

	1902. *Cents.	1903. Cents.	1904. Cents,	1905. Cents.
August 2:				
Sisal hemp	9¾ to 10	7	7⅛	...
"Fair Current" Manila ...	10½	8	9¼	...
November 1:				
Sisal hemp	8¾	7½	8	...
"Fair Current" Manila ...	10¼	8⅞	9¾	...
February 1:				
Sisal hemp	...	7 to 7¼	7¾	7¾
"Fair Current" Manila ...	...	8¼	9½	10
May 1:				
Sisal hemp	...	9 to 9¼	8½	7⅜
"Fair Current" Manila ...	...	9½	...	9½ to 9⅝

* Cent. = ½d.

The most important use of sisal hemp and maguey in the United States is for the manufacture of binder twine. This fibre is also largely used for tarred lath and fodder yarns, and for other cordage purposes.

In Yucatan and South America sisal is employed for cordage, nets, lines, hammocks, saddle cloths, girdles, bridles, etc. The Yucatan sisal hammocks, made from carefully prepared, hand-cleaned sisal, are remarkably strong and durable.

In the Philippine Islands, particularly in the Visayes, considerable maguey fibre is produced for local use. The young and tender leaves are selected and are cleaned by the scraping process used for cleaning pineapple leaves. The fibre thus obtained is soft and fine, and is used for making delicate handkerchiefs and cloth. Maguey is also used to some extent in the localities where it cultivated for making various kinds of cordage.

A maguey or sisal leaf contains from 2½ to 5 per cent. of fibre and from 95 to 97½ per cent. of waste. On the Yucatan sisal plantations the fibre-cleaning machines are placed on raised platforms beneath which are small dump cars that catch the waste as it falls from the machine. This waste consists largely of water, which is allowed to run off; the remaining soft, green pulp and short, broken fibre being run out on the cars to the dump pile.

In Hawaii an attempt is now being made to separate and clean the short fibre that is in the waste, and to utilise this fibre as a filling material for mattresses. The waste fibre is first separated from the pulp with an ordinary pitchfork. It is then steamed to remove the odour, washed, dried in the sun, and passed several times through a picker and cleaner. This process requires so much time and labour that its utility is doubtful.

It has been fully demonstrated that an excellent quality of paper can be manufactured from maguey waste. The principal obstacle to the use of the waste for this purpose is the difficulty and cost of collecting it in sufficient quantity. The use of fibre-extracting machines will result in the production of large quantities of waste when it can be easily and cheaply handled, and will introduce the question of utilising this waste as a paper-making material.

Although the maguey plant seldom suffers any injury from either insect pests or plant diseases, an insect is found in Yucatan, and a fungus disease the Bahamas, both of which do some little damage on the sisal plantations.

In Yucatan an occasional plant is destroyed by a large black beetle, known as the "max," the life history of which is described by Dr. George F. Gaumer as follows:—

"The female insect lays its eggs on the trunk of the henequin plant a few inches above the ground. When hatched, the larva burrows into and through the outer bark to the harder fibre of the interior, when it generally takes an upward direction and burrows from 6 to 12 inches during its larval existence. When full grown it works its way to the bark, where it changes to a pupa, and so remains for some months, when it hatches into the adult beetle and emerges from the plant, which it leaves injured and weakened, but rarely kills. Three or more larvae in the same plant will surely destroy it, but that number is of very rare occurrence."

The fungus disease that has appeared in the Bahamas is described by Lyster H. Dewey, Botanist in charge of fibre plants, United States Department of Agriculture, as follows:—

"When I was in the Bahamas last May, I noticed that there were in a few localities indications of a diseased condition of the sisal plants. I brought back with me some specimens and referred them to the Plant Pathologist of the Bureau of Plant Industry, who reported the presence of a fungus on the leaves, but that it was not in a condition for determination. Recently I have received from one of the principal growers in the Bahamas a letter stating that, while the diseased condition seems to be confined to small areas, it is slowly spreading and causing some alarm lest it may prove destructive."

The symptoms are described at follows:—

"Yellowish spots or patches are first observed on the leaves. These spots spread. The leaf gets dry and curls, usually half way down from the point; the edge of the leaf becomes pinkish in colour. In a week, sometimes longer, the leaf dries and becomes black and hard. Usually the upper half of the leaf is affected, the lower half remaining green much longer. Sometimes the funnel, as it is called in the Bahamas, consisting of the unopened leaves, is attacked at the tip. The disease usually affects only 5 or 6 inches of the upper part of the funnel, but sometimes extends clean to the base.

"This condition has not been observed in the Bahamas until within the past year. It may have existed before, but to so small an extent as to be regarded of no importance.

"I would suggest that the sisal growers of the islands be warned in regard to the possible introduction of such a disease, and that they be urged to go through their plantations, and, if any sisal plants are found exhibiting symptoms of the character described, they should be grubbed out and destroyed."

Plantations should be watched for the appearance of either injurious insects or fungus diseases, as these enemies are much more easily checked in the beginning than after they have become numerous and widespread.

The maguey plant is not affected by hot weather or killed by drought. An exceptionally long period of dry weather may slightly check its growth, but will not seriously injure the plant. Its greatest enemy is fire. When a large quantity of dry rubbish is allowed to collect in the field, and particularly around the plants, there is always danger of fire. If, under these conditions, a fire is once started, it may cause a total loss of the crop.

Mr. Edwards concludes by stating that the cultivation of maguey offers inducements to the small farmer and to the planter with large estates. While the future price of maguey fibre, as of any other agricultural product, cannot be predicted with any degree of certainty, this fibre is a staple commodity the use of which promises to increase quite as rapidly as does its production.

Natal Orchard Association.

SUGGESTIONS TO SENDERS OF FRUIT.

The Natal Orchard Association has issued some "Regulations and Suggestions" for senders of fruit. It is pointed out that the forthcoming export is of a more or less experimental nature, and that (which must be clearly understood by all senders) it is only by a close application to the details of preparing and packing the fruit that senders can hope for success. The grower is the only one who can judge of the ripeness and suitability of the fruit for export: consequently he must only send exactly what is mature. Closest attention must be given to grading and cleaning of fruit from scale. Further, all fruit must be wrapped in the printed papers supplied by the Association. The grade for oranges will be as follows:—1st, 10 inches, and 2nd, 9 inches.

Prior to any boxes, etc., being sent to Durban, it is essential that each grower shall sign a guarantee* indemnifying the Association against loss on their own consignments, also their *pro rata* charges. Immediately the exact number of cases or boxes is known, the grower must advise the Secretary of the Association of the full particulars, viz., number of cases or boxes, nett contents, measurement, and weight. All consignments are to be railed (carriage paid by grower) direct to the African Boating Company, Point. Growers should so arrange their cutting, etc., as to allow of the fruit being received at the Point early on Wednesday morning, in order that fruit may be examined prior to shipments, and also that there may be no excuse for rough handling in the actual process of loading. Growers must adhere as near as possible to the quantities promised, as it is quite probable that the first shipment or two will not realise quite as much as it is hoped, but it must be understood that the average price throughout the season is the only fair way to judge if the market is remunerative or otherwise.

Boxes will arrive during April; and growers must inform the Secretary of the Association at once how many boxes, etc., they will require of each size. The sizes run:—No. 1 tray, 18in. x 12in. x 2½in., to hold 24 selected naartjes; No. 2, to hold 100 naartjes, 1st grade, size 24in. x 12in. x 6in.; No. 3, size 24in. x 12in. x 8in., to hold 56 oranges. Boxes, etc., will be despatched from the Point immediately on arrival, carriage forward, or, in cases where the carriage has to be prepaid, a remittance must be sent immediately on receipt of debit note for same. Wood-wool and wrapping papers will be debited to each grower, and recovered by the Association debiting the amount against account sales. The same course will be adopted in regard to freight paid by the Association, consequently the only initial outlay to the grower will be the paying the carriage to the Point. A debit note will be sent with each rail advice note of boxes, etc., and growers are requested to note that no claim for short delivery will be taken notice of unless made within three days of receipt of shooks, etc.

Every grower must register at once the brand, or initials under which he intends to ship, each box to bear the said brand or initials, with the name of fruit and quantity clearly stencilled on at least one end, preferably both. Sets of stencils for the purpose are supplied by the Association.

No. 1 trays must be made up into crates, or bundles of four boxes, allowing battens for ventilation. Nos. 2 and 3 boxes must have the batten nailed on the bottom of the box at both ends.

The first shipment will be sent as follows:—A portion as "deck cargo" and "between decks" (rate 25s. per cubic ton, or 7½d. per No. 2 box), a portion in "cool chamber" (rate 70s., plus 10 per cent., or, say,

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* Printed guarantee and supply forms may be obtained from the Secretary of the Association, 13, Castle Buildings, Durban.

1s. 10d. per No. 2 box). The diffierent parts of the ship where the fruit is to be stored will be apportioned as equally as possible to minimise every sender's risk, but it is advisable that all "trays" (selected fruit) should go in the "cool chamber." Growers can, however, specify how they would like their fruit sent. If by cool chamber, the boxes or package of trays must have the words "Cool Chamber" stencilled on the lids.

Account sales will show the actual gross amount realised on each consignment, less the total amount of London charges (say about 7½ per cent.), and the detail of Natal charges, viz., wharfage ⅛ per cent. on value, exchange, stamps, and Secretary's commission 2½ per cent. The detail of London charges (if any) can be obtained, or sender can see the original account sales at the office of the Association.

It has been arranged that Mr. F. L. White will travel to England with the first shipment, and he has kindly consented to make a daily report on the condition of the fruit stowed in the various parts of the ship, and also to assist and advise the London agent for the first three shipments as to the best means of disposing of it either in London or the provincial towns. Fruit for the first shipment will be inspected by Mr. White, the Government packer, and the Secretary of the Association, who, if they consider the quality or condition unsuitable for export, may either reject it or have it sold apart in London as unguaranteed fruit. Subsequent shipments will be examined by a member appointed for the purpose, assisted by the Secretary of the Association. All fruit sent will be insured against "total loss."

It may be of in terest to growers to export other than naartjes and oranges, such as Seville oranges, shaddocks, Spanish lemons, etc., in which case the London agency will communicate with jam makers, etc., in order to find a remunerative outlet.

Growers must realise that a certain amount of initial outlay is required in every new venture. Also, a considerable amount of extra labour will be entailed, as otherwise, if indifferent fruit is sent, the sale of Natal fruit will be spoiled, and it will take years before the lost ground is recovered. The success of the export of fruit rests solely with each grower, who, by careful attention to the details, however seemingly trivial, will help to build up a connection with the largest and best market in the world, that will prove of inestimable advantage to growers in particular and to the Colony in general.

It is hoped that this experimental export will prove to growers the vital necessity for co-operation amongst growers, and that with the little "give and take" that is necessary in a society of this nature, growers will be able to realise that the old motto, "Unity is Strength," is as true to-day as when it was first uttered.

Bacon Factories.

At a recent meeting of the Gloucestershire Chamber of Commerce, Mr. Lodon M. Douglas addressed the Chamber on the subject of a proposed bacon factory for the county.

During the course of his remarks, Mr. Douglas said the value of the pig is becoming greater every year, owing to the immense improvements which have taken place in connection with dairy farming, as it has long been proved that the best use to which the separated milk in connection with creameries can be put is to convert it into bacon.

Much, of course, depends upon the pigs that are grown. In the United Kingdom there are six recognised breeds, namely, small white Yorkshires, middle white Yorkshires, large white Yorkshires, Tamworths, Berkshires, and Suffolks, or small black breed. During the last year or two, particular attention has been given to the large black breed, and many have prophesied that it will become as popular as the Yorkshires, but so far there is no evidence that the demand for this particular kind of pig has injured the breeding of the others. Of all these breeds, the principal ones are the middle-white Yorkshires and the Berkshires.

Referring more specifically to the starting of the bacon-curing industry on co-operative lines, Mr. Douglas said there would be no difficulty in sustaining the supply of raw material. This, however, altogether depended upon the farmers themselves, who, unless they recognised pig-breeding as a serious part of the economy of the farm, were not likely to contribute much to the development of the bacon-curing industry.

In Natal the development of this industry has been much hampered by the want of organisation on the part of the farmers. To keep a factory going, there must be an unfailing supply of pigs—a certain number monthly must be guaranteed, according to the capacity of the factory. To ensure such a regular supply, it is necessary for a number of farmers to organise and run a factory on *co-operative* lines, each member guaranteeing to supply to the factory a certain number of pigs monthly, under a heavy penalty for every animal below the prescribed number. He may, of course, supply as many more than that number as he likes. A note is kept of the number of pigs supplied by each member, and payment is made for the number in addition to a periodical distribution among the members, in proportion to the number of pigs supplied during that period, of the profits accruing from the sale of the bacon, etc. By this means, from the point of view of the society as a whole, the supplying of the minimum number of pigs required to keep the factory going at a profit, is ensured; and, from the point of view of the individual members, there is at hand a ready market for all the pigs they like to produce, and there is the additional incentive of a profit on each pig, the breadth of which profit would probably increase in proportion to the number of pigs dealt with by the factory.

Denmark, with its pig and dairy industries, probably stands first as an example of what co-operation can do for a country. As Mr. Douglas points out, the success of the pig-breeding industry in the country is due principally to the fact that the Danish farmer has recognised the value of co-operation in nearly every department of his work. It is over a quarter of a century ago since the Danes realised that there was a market for bacon in England of which the British farmers refused to take advantage. They at once formed co-operative societies, the first of which was started in Horsens, and was a complete success. This society was quickly followed by the organisation of similar factories in various parts of the country, all, or nearly all, on co-operative lines. At the present day there are some thirty of these factories throughout Denmark; and when it is recognised that this small country is about the same size as the Province of Munster, in Ireland, and also that the food supplied for the pigs, such as rye and maize, have to be imported, the grit of the Danes and the value of their principles of working will be realised.

There is no need to comment upon feeding stuffs in a country like Natal; but the value of what might be termed thorough organisation in the pig-breeding industry cannot be too fully emphasised. The farmer's responsibility does not end with the fattening of the pigs, however scientific and up-to-date his principles may be. He must pay as much attention to the conditions attending the marketing of his animals as to feeding. Tying a pig's legs together and bundling him into a truck may be a very convenient method of marketing, but, apart from humanitarian considerations, it is not conducive to the attainment of the best results. As with the fruit industry, so with swine husbandry: large profits, and successful results generally, depend to a considerable extent upon the condition in which commodities are placed upon the market.

In the course of his address, Mr. Douglas described the form of a suitable bacon factory. An economical factory usually takes the form of a hollow square, and would rest preferably in one storey on a piece of ground about 200 feet square, covered with, say, five parallel roofs at an elevation of about 15 feet to the wall plate. The roofing could be of galvanised iron. The only really substantial parts of the buildings would require to be the cellars themselves and the engine-room.

The operations of such a factory are also described. The pigs are driven into pig styes, where they are rested. They are then driven one by one into a shackling pen, where they are hoisted to a bar, head downward, and they are at once despatched, and all the blood allowed to run out. The carcases are then rolled into a scalding tank, where they are allowed to remain until the hair can be easily removed. They are then rolled on to a scuttling table, where they are scraped, and immediately they are hoisted into a vertical singeing stack, where they are subjected for about a quarter of a minute to intense heat. This fire has the effect of hardening the rind, and also imparting a flavour to the meat. There are, of course, other methods of treating pigs for special purposes.

The principal feature of curing is the machinery. There must be a full complement of mechanical appliances, and the principal of these is the refrigerating machine, upon which the temperature in the chill room and cellars absolutely depends. A constant temperature is what is wanted, and constant curing conditions can only be obtained by the construction of suitable rooms, the atmosphere of which is under the control of mechanical refrigeration. The reason of this is that the public taste now-a-days is for mild cured meats, and it is quite impossible to cure meat in a mild way except in a constantly cooled atmosphere.

The mild cured meat may not always be acceptable, but it is certainly more nutritious than meat which is heavily salted, as, as has been already hinted, the heavier the salting and the longer meat remains in salt the less nutritious it becomes. This seems an additional reason why factories should succeed locally, as bacon which has to be sent on long voyages must be either heavily salted or packed in borax.

"I have said enough to show you," said Mr. Douglas, in concluding his address, "that there is an industry waiting to be developed at your doors here, and it would be a gratifying thing if you were to co-operate together and put down the first co-operative bacon factory in England."

In Natal we have made false starts in connection with co-operative bacon factories; but, under the conditions now prevailing, there seems no reason why one conveniently situated central factory worked on proper co-operative principles should not prove a great success.

The Marketing of Potatoes.

All the indications point to a phenomenal season in respect to at least two of the main crops of Natal—mealies and potatoes. Readers are aware of the steps which are being taken by the Minister of Agriculture to secure a market oversea for our surplus mealies. Unfortunately, however, precisely the same steps cannot be taken in regard to the thousands of muids of potatoes which farmers have on their hands. London market prices quite preclude all idea of finding an outlet for our surplus potatoes in Britain; and in Natal there is no market for the surplus production.

A correspondent in the Marburg district writes that he has a crop of between 500 and 600 muids of potatoes of first-class quality, for which he can find no market. He has submitted samples to agents and produce merchants in Durban, and has advertised in the press for a fortnight, but all he has been able to dispose of is fourteen muids. "I know others," he says, "who have theirs rotting, and others who feed their pigs on them, because they cannot sell any, and the latter tell me that pigs are not particularly fond of potatoes."

Readers are invited to refer to the inquiries which the late Minister of Agriculture (Mr. Clayton) caused to be made during 1905 at all the various South African ports. Summaries of the replies that were received were published in the March, April, and June, 1905, issues of the *Journal.* From these replies it appeared that the average prices of imported potatoes at certain ports were:—

Delagoa Bay.—January to March, 18s. per bag of 160lbs. Duty, 20 reis per Kilo. (1,000 reis equals 2s. 3d.; one Kilo equals 2 1-5th lbs.)

Mossel Bay.—January to April, 12s. 6d. per 100lbs. No duty.

East London.—Seed, for November to April sowing, 10s. per 100lbs. No duty.

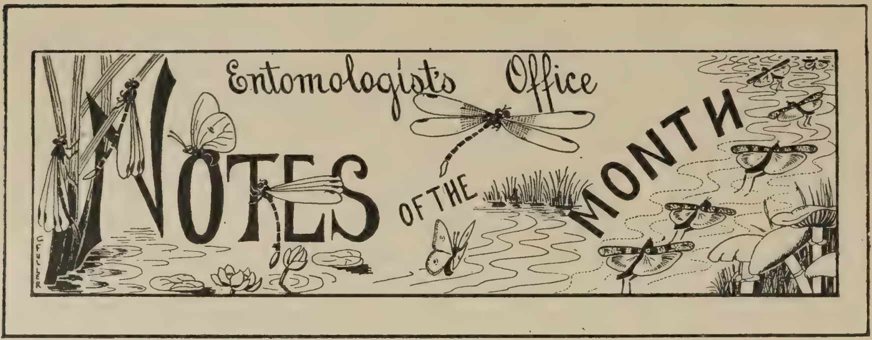
Port Elizabeth.—January to September, 10s. per 100lbs.; ordinary average price, 8s. per 100lbs. No duty.

A comparison of these prices with those ruling in Natal will show that, in some at any rate of the South African Coast ports, there is a profitable market open for Natal potatoes.

The freight for all produce (except forage and hay) for East London, Port Elizabeth, Mossel Bay, and Capetown is 15s. per short ton, or 40 cubic feet. These rates are nett, and include shipping and landing, except at Mossel Bay, when the landing is payable by the consignee.

If the potato-growers of this Colony were to form a co-operative potato-selling association and appoint someone whose sole duty it would be to keep himself informed of the probable crop for disposal and in touch with the markets in the neighbouring Colonies and at various ports of South Africa, large contracts could be entered into and every opportunity taken of fluctuations in market values in the various centres.

Some curious cases of animals having portions of their tongues bitten off by horses have been recorded. In one case a pony had 3½ in. of its tongue bitten off presumably by a horse in the adjoining loose-box. In another the victim was an ox, which was trying to lick up a few oats from the manger of the horse in the next stall. The horse ‘watched his opportunity, and bit off about 3 in." of the tongue. In a third case a horse bit off about 4 in. of the tongue of a cob stalled next to it, and presumably ate it, as no trace of the missing portion could be found.



Suggestions.

Winter Spraying.—Those parties who intend spraying their trees this winter, particularly pears for blight and peaches for peach freckle, should make arrangements to secure a proper spraying outfit in good time.

Pruning.—Arrangements should now be made to secure good pruning tools to do the winter work with; the decay and even death of many trees is due to careless pruning and the use of bad tools, which leave scars upon the trees through which fungus parasites gain an entrance and destroy the core of the tree.

Horse Bots.—From now on a good look out should be kept for the eggs of the Bot-fly. Prevention is better than cure, and by cutting off, singeing or greasing the hairs to which the eggs are attached at intervals of 7 to 10 days during the 6 or 8 weeks in which they are laid will not only prevent a gross infestation of the stomach by these creatures, but help to materially reduce the pest.

Arsenic.—Farmers requiring a supply of arsenic or arsenite of soda for the destruction of locusts next season should make an early application for the quantity they desire to this office. The material will be supplied at cost price.

Fruit Fly in Oranges.—All fallen citrus fruits should be carefully gathered and buried. This crop contributes more to the abundance of the fly in many neighbourhoods than any other factor. Those who are interested in the control of this pest are recommended to make an experimental trial of spraying with arsenate of lead and treacle, using 1 ℔. of arsenate of lead, 5 gallons treacle to 25 gallons of water. The spray should be put on coarsely as it is only to act as a poison bait to destroy the adult flies which now abound amongst citrus trees.

LOCUST CAMPAIGN.

Early this month the locust campaign was brought to a close. Speaking from personal knowledge, the hatching this season has been the greatest since 1899. Hoppers hatched in great numbers practically throughout Zululand and the greater part of the Vryheid district as far as Paulpietersburg area. Natal was invaded further than formerly, Weenen, Pietermaritzburg (Ixopo), and Alfred Counties being more greatly infested than heretofore.

Owing to the small amount voted by Parliament it was impossible to cope with the invasion in any organised manner, but despite many drawbacks—the want of time, of money, and poison—a considerable amount of good work was done in many directions and numerous native crops saved from immediate destruction throughout the country.

This Colony is greatly indebted to its neighbours, the Transvaal and Orange River Colony, for the loan of poison. The former Colony supplied us with ¾ of a ton of arsenic and the latter with five tons of arsenite of soda. In all about 15 tons of poison was used or supplied to farmers by the Government. This amount, however, proved wholly inadequate. Ten tons were cabled for from England, but, owing to the difficulty of obtaining this, the bulk of that ordered did not come to hand in time; and, unfortunately, owing to an unexpected hatching of locusts in the O.R.C., of that which did arrive a return had to be made much earlier than anticipated. Had it been possible to retain this amount the work could have been carried to a finality in many parts where it had to be abandoned and left unfinished. The disbursements for the season already amount to £3,300 in excess of the sum originally voted.

LOCUST PARASITES.

According to some irresponsible writers this office is blamable for not giving more attention to the question of controlling locusts by means of the natural enemies of the pest, and is even unacquainted with such.

The parasites which have been observed preying upon locusts in Natal are: 1, A small wasp which develops in the egg—one egg accommodating a single parasite; 2, a tachinid fly, much like a house fly, the maggots of which live in the egg-pods and destroy most of the pod; 3, a beetle grub which burrows through the soil and destroys the eggs in the pod; 4, a hair-worm or nematode which lives in the body of the locust and destroys it; 5, a small red mite, a tick-like creature, which attaches itself to the flying locusts and considerably weakens its host when in any numbers; and lastly, the locust fungus.

It is not my intention to enter here into any dissertation upon the practicability of encouraging these parasites, because I do not see how it could possibly be done, and I may say that their influence upon the host is infinitesimal. On occasions, however, large numbers of locusts or batches of eggs are destroyed by these natural checks, and it is such occurrences as these which give rise to hopes of better things, from such sources, in the minds of those who have not studied and can scarcely be expected to study the question in all its bearings.

The locust fungus has been well in evidence this season, but, speaking generally, its influence has been most disappointing. Never to my knowledge have we had so suitable a season, in respect both to meteorological conditions and abundance of locusts, for a general and natural outbreak of this disease.

To those who are unacquainted with the fact, I would remark that cases of locusts dying from natural infection have been continuously under notice. In November last winged locusts dead of fungus prior to egg-laying were abundant, and from all parts of the Colony I have reports of the presence of this parasite amongst the locusts. These facts show that the mould which infects the locusts is naturally widespread, and as it has not swept off the creatures we are now justified in placing small reliance upon its use. In short, we have found nothing equal to the arsenical poisoning of locusts, particularly after the hoppers are a fortnight old.

NURSERYMEN'S PERMITS.

Under the South African Plant Import Regulations governing the inter-colonial trade in nursery stock, permits have been issued to the following nurserymen to trade their stock in Natal. These permits hold good for the next 12 months, and are issued upon a confidential report of the state thereof furnished to this office:—

CAPE NURSERIES.

Pickstone Bros., Groot Drakenstein, general.
Flanagan Bros., Komgha, general.
Grace, J., Kingwilliamstown, general.
Holder, J. S., Kimberley, general.
Meyers, H., Paarl, general.
Patzold, A., Tarkastad, general.
Smith Bros., Uitenhage, general.
Fraser, Modder River, general.
Summerton, T., Alice, general.
Vester, W. R., Paarl, general.
Joubert, Wellington, general.

Cloete, H., Wynberg, vines only.
Lester & Jenkins, Constantia, vines only.
Murray, T., Constantia, vines only.

O.R.C.

Pickstone Bros., Platkop, Ficksburg, general.

CARNATION DISEASES.

Several parties have referred cases of carnation failures to me. Mr. Bell, of Krantzkop, furnished several specimens which I was able to examine; and, although a satisfactory conclusion was impossible, there was sufficient evidence to show that the plants had succumbed to the attack of a fungus parasite upon the root system. Whether this was the immediate and only cause I am unable to say. What seems most probable is that the plants were weakened by the presence of excessive moisture in the soil and consequent want of aeration. This condition is often sufficient of itself to destroy plants, and in any case renders them more easy victims to parasitic fungi or to the saphrohytic fungi living upon organic matter in the soil.

If it is not a question of drainage but of direct attack upon the roots by a fungus parasite, it is usually the best plan to remove and destroy garden plants before the soil becomes greatly invaded and many plants attacked, as many of the parasites are omnivorous in the matter of plants' roots. Valuable plants may be treated, and, whilst a cure cannot be guaranteed, success has attended the drenching of the soil with a solution of copper sulphate or bluestone prepared by dissolving this in the proportion of 3 lbs. to 10 gallons of water.

CATERPILLARS ON FIGS.

Specimens of looper and other caterpillars feeding upon the foliage of the edible fig were submitted by Mr. Spence, of Maritzburg. These soon after their receipt entered the pupa state, and adult moths have since emerged. The creatures have no popular name, but are known as *Trochila fificola,* the moth being a night-flyer of a general reddish-brown colouration. This insect is not common, nor to be regarded as a general pest, although in this case it was somewhat destructive. Its abundance is controlled by wasp parasites, a number of which emerged from the caterpillars in question.

When the pest is sufficiently bad to call for treatment, spraying with arsenite of lead 1 lb. to 50 gallons, or Paris green 1 lb. to 100 gallons, of water will prove an effective remedy.

OAK CATERPILLARS.

The small green slug-like caterpillars, covered with rosettes of sharp spines—the puncture of which causes the painful sensation which has given these creatures the name of electric grubs—have been particularly abundant on oaks. Wattles and fruit trees have also suffered from their attack in certain parts. This is a native insect, and its abundance is usually controlled by parasites. Its treatment is similar to that recommended for the fig caterpillars.

* * *

MINA LOBATA BEETLES.

Mina lobata is a singularly handsome annual creeper of the convolvulus tribe—but differing greatly in the inflorescence—which is becoming very popular in Maritzburg. During the two previous seasons it remained immune to insect attack, but this year a native beetle has taken a fondness to it, as well as to the convolvulus vines which grow in weedy luxuriance in every vacant plot.

In one case the beetle is a nuisance, in the other it seems a pity that there are not more of them, for the convolvulus is a most troublesome weed.

To anyone at all interested in natural history, I would recommend this small creature to their notice. It is particularly fascinating, and the whole development may often be viewed if a few minutes are devoted to an infested vine.

The beetles are somewhat like small tortoises and ornamented with gilded patches. Their eggs are deposited upon the under-sides of the leaves, all together in a little brown-paper-like packet attached by a stalk to the leaf surface. It is the growth of the larvae from these which afford so much interest. All who have studied insects know that in the larva stage they moult their skins several times, as the snake sheds its skin. As a rule these moults are discarded or even eaten, but in these beetle grubs they remain attached to the tip of the abdomen, one surmounting the other in a most bizarre and fearsome form. More than this, the tip of the abdomen is articulated and the grub can lay the appendage down flat upon its back or erect it at will. The pupa or resting stage of the beetle will also be found attached to the leaves, and is no less grotesque in appearance than the grub.

Spraying with arsenite of lead and water has been found an effective remedy.

LUCERNE CATERPILLAR DISEASE.

During March Mr. Worthington reported that the lucerne caterpillars (*Colias electra* and others unidentified) had died wholesale of an infectious disease due either to fungus or a bacterium. Whilst, from experience, there is little ground to hope that this may be made of some practical use, still it is a matter open for investigation, and where lucerne-growers notice flaccid and dead caterpillars hanging to plants they might with advantage collect them and after macerating them in 3 or 4 gallons of warm water, spread the disease further amongst the enemy by spraying over the affected areas of their fields.

PIGEON FLY.

This creature is one of the flying ticks, and has been reported to me from Ladysmith and Maritzburg. It is a biting fly related to the sheep spider and ostrich fly. It is remarkable because it produces its young one at a time and in the pupa stage. In other words, the maggot lives within the body of the parent and is nourished upon the secretions thereof—as is also the case with the tsetse flies.

These creatures dart upon their hosts and enter the feathers with great rapidity and remarkable facility, and their long, spidery legs render them somewhat awesome in appearance.

Organisation of the Tobacco Industry.

ENTERPRISING VRYHEID FARMERS.

Last year Natal exported to other States of the Customs Union 1,301,314 lbs. of unmanufactured tobacco, valued at £19,304, of which 922,557 lbs., worth £14,774, were sent to the Transvaal.

It has for some time been a matter for comment that Natal should export so much of her raw tobacco to the Transvaal for treatment at the factories there. As far as can be seen, there is no reason whatever why a factory or factories should not be started in Natal for the treatment of tobacco grown in this Colony. It is true that we turn out a fair quantity of cigars, cigarettes, and pipe tobacco, as will be seen from the following figures, but this fact serves as an indication of the possibilities Natal has in the direction of the manufacture of tobacco, and furnishes additional reason why the unmanufactured tobacco that at present exported should not be treated locally:—

EXPORTS OF MANUFACTURED TOBACCO, 1906.

	To other States in Customs Union. £	To Transvaal. £
Cigars	12,318	8,848
Cigarettes	4,507	2,556
Manufactures, not otherwise described	5,630	2,738

Tobacco appears to grow well in nearly every part of the Colony. Some of the Coastal districts, and Weenen, Vryheid, Utrecht and Paulpietersburg are, however, the best known of the tobacco-producing districts.

Factories could very well be established, on co-operative lines, far enough inland to be away from the influence of the sea air. It needs only a few farmers interested in the industry to band together and form a co-operative society to set a factory going. Once there is a factory in operation, farmers will go in for tobacco cultivation much more largely than they do at present, as they will be assured of a ready market for the leaf. Under these circumstances, it is gratifying to note, in the *Vryheid Herald* of a recent date, that the farmers of Vryheid district are awaking to the possibilities that lay before them in the direction of tobacco culture. A preliminary informal meeting was held towards the end of March to discuss the best means of establishing and organising the tobacco industry in that district.

Mr. Fergg, M.L.A., who occupied the chair, first addressed the meeting. Such a factory as was proposed would undoubtedly be a very valuable asset not only to the district, but to the Colony in general, and its success, if conducted in a thoroughly practical manner—as it must be—was a certainty. All similar institutions, such as Van Erkom, Hartley & Co., etc., had originally started in a small way, and were at the present moment all well-to-do. The former, to his personal knowledge, commenced business with a couple of rolls which he cut up himself and hawked about; but by gradual degrees his business increased, until at the present moment he was worth at least £60,000, and owned one of the most flourishing businesses in the whole of South Africa.

Continuing, the speaker said that Vryheid possessed as good ground for tobacco as any part of the Transvaal. The benefits derivable would be appreciated not only by the farming and commercial communities, but by the consumers in general, as a constant supply of the very finest tobacco obtainable would be assured. Piet Retief tobacco was considered—and very righty so—the best tobacco in South Africa, and as Vryheid possesses exactly the same soil and facilities for growing, no further argument in its favour should be necessary.

Mr. R. Levisohn next spoke. In the course of his remarks he said that his experience in tobacco growing had been considerable, and he could positively state that there was no risk attached to it. Another thing in its favour was the insignificant amount of capital required. He had gone carefully into statistics (as far as they were obtainable) with regard to the local production, which for the last twelve months had been approximately 65,000 lbs., or otherwise an estimated annual turnover of £6,000. This was in tobacco alone. In addition, the consumption of snuff must be taken into consideration, representing a larger monetary value than many realised. This could be dealt with in conjunction with the tobacco; and the manufacture of cigars and cigarettes, which would undoubtedly represent an important item of revenue, could be included later on.

The Chairman wished to impress upon the meeting that the factory must be in a position to cure tobacco according to the growth and quality, and that the onus of choosing suitable leaf rested entirely with the factory. For that reason they must secure absolutely the very best quality obtainable and none other. And further, a thoroughly efficient man—also the best obtainable—must be engaged to buy and cure. As such efficiency can only be assured after years of practical experience and study, to know everything there is to be known in connection with this particular industry, the company must be prepared to pay a salary commensurate with such special knowledge. At present the farmers, after gathering the leaf, roll it up, and same in due time sweats and ultimately rots, which of necessity represents a dead loss somewhere.

He further said the whole movement must be co-operative, and the protection of the small man its chief study. And knowing the country as they all did, it would hardly be necessary for him to advise them to protect themselves to the extent of insuring their crops, which he understood it was possible to do.

At the conclusion of the proceedings a committee was elected, consisting of Messrs. Cheere Emmett, M.L.A., P. R. Fourie, and J. Rabinowitz, with Mr. R. Levisohn as secretary, *pro tem.*

If a society is formed on co-operative lines, there is every chance of success; and the concern will be a more profitable one to all the members than if a company or syndicate were formed in the ordinary way. Further and more representative meetings are to be held; and the course of this new venture will be followed with interest by tobacco-growers in other parts of the Colony.

An Italian horticultural journal has brought to the notice of the authorities at Kew a new fruit from Uruguay, identified as *Pouteria suavis*. It is about the size of an apricot, but of the shape of an apple; it is yellow and scarlet when mature, and possesses a perfume so delicate that it is equalled in no other fruit. The seed is like a large hazel nut, but the edible fleshy part of the fruit is small; it has, however, an extremely agreeable taste, and possesses such a remarkable digestive property that when the aborigines have over indulged, they eat freely of this before lying down at night, and then they sleep like a child and wake up the next morning with a clear head and a wonderful appetite.

Natal Agricultural Union.

ANNUAL CONFERENCE.

THE Annual Conference of the Natal Agricultural Union was held in the Supper Room of the Town Hall, Pietermaritzburg, on Wednesday and Thursday, the 10th and 11th of April. The Rev. Jas. Scott, President for the past year, presided. The following Associations were represented by the delegates indicated:—

Alexandra Agricultural Society: J. Kirkman, M.L.A., Hon. R. M. Archibald, M.L.A.

Alfred County Farmers' Association: A. G. Prentice and C. A. Holwell.

Acton Homes Farmers' Association: G. H. H. Coventry and J. W. Coventry.

Boston Farmers' Association: T. Thring.

Bergville Farmers' Association: G. L. Coventry and J. G. Fannin.

Camperdown Division Farmers' Association: J. Moon and W. E. Allsopp.

Donnybrook Farmers' Association: W. Hale Walton.

Durban and Coast Agricultural Society: E. W. Evans and T. Burman.

Dundee Agricultural Society: H. Wiltshire and W. Craig.

Durban Poultry Club: W. E. Allsopp.

Ginginhlovu Farmers' Association: H. H. Thole.

Gourton Farmers' Association: W. C. Stockil and M. Sandison.

Highflats Farmers' Club: L. H. Gray.

Hattingh Spruit Farmers' Association: D. Tandy and T. B. Smith.

Ixopo Agricultural Society: C. E. Hancock and J. Anderson.

Ixopo Farmers' Association: A. Keith.

Inanda Agricultural Society: T. Polkinghorne.

Ingogo Farmers' Association: A. Wood and E. W. Noyce.

Klip River Agricultural Society: J. T. Francis.

Lower Tugela Farmers' Association: A. E. Foss and Col. Friend Addison.

Little Tugela Farmers' Association: F. I. de Waal and F. G. King.

Lower Umzimkulu Farmers' Association: J. C. Aiken and C. H. Mitchell.

Mooi River Farmers' Association: R. Garland and H. Blake.

Mid-Illovo Farmers' Club: J. Ballam and B. B. Evans.

Malton Farmers' Association: R. W. Comins and C. L. Lund.

New Hanover Agricultural Society: E. Peckham and Rev. J. Scott.

Newcastle Agricultural Society: F. A. R. Johnstone, M.L.A., and S. W. Reynolds.

Noodsberg Road Agricultural Society: H. Baynes and J. H. Hollings, jun.

Nottingham Road Farmers' Association: J. King and B. Crompton.

Richmond Agricultural Society: J. Marwick.

Royal Natal Agricultural Society: D. C. Dick and O. Hosking.

Seven Oaks Farmers' Association: J. van Rooyen.

Slang River Farmers' Association: G. Kolbe and J. Uys.

Umvoti Agricultural Society: W. J. Newmarch and E. J. van Rooyen.

Umvoti Farmers' Association: P. R. Botha and W. J. Slatter.

Upper Biggarsberg Farmers' Association: G. Langley and W. L. Oldacre.

Utrecht Farmers' Association: G. J. Shawe and D. Van der Spuy.

Vryheid Farmers' Association: T W. Dukes and E. Northern.

Weenen Agricultural Society: R. H. Ralfe and J. H. Miller.

Ward I. Farmers' Association, Vryheid: A. von Levitzow and F. Kolbe.

Zululand Agricultural Society: W. Saville.

Executive, not as delegate: T. G. Colenbrander.

A motion in favour of the reading of the minutes of the last Annual Conference having been lost, the President delivered his address as follows:—

"Gentlemen,—We have met once more to review the agricultural doings of the past year, and to consult in respect to the future; to give one another advice, and it may be comfort in regard to past failures—such advice as may, I trust, turn past failures into future successes. The past year has not, on the whole, been a very bright one for the agricultural community in Natal; though I doubt if their position has been any worse, if so bad, as that of our friends engaged in commerce. Generally, crops reaped in 1906 were poor, drought in the early part of the year being the cause. The disturbed state of the country did not mend matters, many farmers having to leave their proper sphere and exchange, I am sorry to say, the plough for the sword and rifle. In our own sphere a threatened enemy has got fairly into our midst. East Coast Fever has now a very strong hold of our Colony. I may have something more to say on this subject, but for the present will pass to more general matters.

"For some time a cry has been rising, and is accentuated by the bad times we have been passing through, for a greater development of the agricultural resources of Natal. No thoughtful man can do otherwise than realise the need for agricultural advance in the Colony. From the nature of the country that advance must be slow, and if attempts be made to hurry it overmuch nothing but failure can result. A great deal of rubbish has of late filled our newspapers in regard to closer settlement. One writer who poses as an authority in a recent article says: 'We are told by every authority that our climate is one of the finest in the world, our soil of the most fertile and responsive to be found anywhere, our rainfall adequate to all demands, our crude labour supply ready to hand, our market at our doors, and yet we do not stir, we remain inert. Moreover, we find some miserable traducers who deny the above conditions.' Well, at the risk of being called a 'miserable traducer,' I, for one, most emphatically deny, and I feel sure that I will be supported by the majority of those who have any knowledge of the subject, that 'our soil' is 'of the most fertile.' In place of its being of the most fertile, I doubt whether 10 per cent. of Natal soil will, without a liberal treatment with manure, produce crops to pay for the labour expended upon it. Even in this season above an average I can take the writer to land which was well manured and well cultivated where the crop is not worth reaping. Our climate is a very pleasant one, but how about our farmers whose crops have been totally destroyed by hailstorms? Is our rainfall adequate to all demands? Probably it is at times more than adequate, when, as has happened on several occasions within the last three months, four or five inches of rain falls in a few hours, and acres of soil, with the crops standing on them, are carried completely away, and fences, which were supposed to be well above high-water mark, are found far away from their original position, a tangled mass of wire, standards, and straining poles. But is it adequate when we have months and months without a shower, as we had no further back than 1906, and in many other recent years? In such seasons seed time passes, the ground is too hard for any plough to touch it, while herds of cattle, reduced to skeletons, wander about over sunburnt pastures, seeking food which is not to be found. 'Crude labour supply ready to hand.' Is there a farmer in Natal who can depend on labour when he requires it, except those who have large tracts of land on which natives reside, and give labour for rent; or those who, as most of our progressive farmers do, employ imported labour from India? Why is this, if we have a supply of crude labour? 'Our market at our doors.' Where is this market, when, with the hope of having a few muids of mealies to spare, some of us will be asked to take steps to secure a market in London, which is scarcely at our door. How many other drawbacks has the farmer to contend against, many of which are unknown in other lands? Within the memory of some of us, how often have the cattle of Natal been swept off by lungsickness, foot and mouth disease, redwater, rinderpest, besides the annual losses by gallsickness, anthrax, etc., to say nothing of East Coast Fever, which is now doing its deadly work? How often does horsesickness sweep over the country? How often has drought destroyed promising crops, and how often have locusts left bare fields where flourishing crops were growing? The writer I have referred to waxes indignant that men of experience, with character, energy, and intelligence, are being driven out of the Colony through the doings of the Land Board. Now, does it not seem rather contradictory that the man who has enjoyed all the wonderful advantages described by this writer, and having energy, etc., etc., yet is obliged to leave the Colony unless he is taken by the hand and nursed on public funds?

"I believe this country may in time carry a much larger white population than at present, but this can only come about by degrees. To-day, to become a successful farmer in Natal, a man must either have a very considerable capital, as well as some experience of how to use it, or else he must be willing to fight the battle which the earlier settlers fought, to live, it may be, for years on what he can produce out of the soil, to work hard, and deny himself not only comforts, but even things considered necessities. Then in time he may work himself into an independent position. To-day there seems a desire to begin without capital, and yet to enjoy all the comforts and conveniences which others have acquired through years of hard toil. We find men who ought to know better urging the Government to give not only the land, but to support from public funds those who have no experience of farming, and who have been more or less failures in other lines of life. It may be perhaps necessary where large irrigation works are required, as at Winterton, for the Government to find the necessary capital. I very much doubt if the settlers there will be able to pay the very heavy rents required to meet the interest on the outlay. In time they may be able to do so, but it will only be by hard and steady labour.

"At our last general annual meeting it was resolved to hold a special meeting at an early date, to consider several resolutions relating to native affairs. The executive fixed this meeting for May 18th. When that day drew near the circumstances of the Colony were such that it would have been injudicious to hold a meeting, and probably, had a meeting been called, a quorum would not have been obtainable. As soon as circumstances permitted, a meeting was convened, and fairly well attended. One of the principal motions left over by the annual meeting for the special meeting to consider was that which asked the Government to appoint a commission to inquire into native affairs. When the Union assembled, on 10th October, a Commission had already been nominated. With such a Commission about to sit, it was not considered advisable to debate native matters very fully. A considerable amount of discussion took place on the personnel of the Commission, and a resolution was passed asking that the number of members be increased, and a list of names of those considered suitable by the Union for such addition was submitted. The reply will come before you, the result being that the Commission remains as originally gazetted. As this Commission has not yet reported to the Governor, it would be out of place in me to say anything of its work. I believe the report is expected in June.

"Let us now take a cursory glance at a few of our leading productions.

CATTLE.

"Putting on one side East Coast Fever, cattle have thriven fairly well during the past season. As usual there has been a considerable percentage of loss caused by the ordinary diseases known as gall, bush-sickness, etc. The winter of 1906 was severe, and cattle generally were in low condition, but owing to the mild spring, so far as I am aware, there were not many heavy losses. Owing to the depreciation in cattle, from the inflated prices during war times, the profit and loss account of most herds of cattle show something on the wrong side of the ledger. This is not to be wondered at when we remember that the ox, which five years ago would have fetched £27, will scarcely bring £9 to-day.

DAIRY FARMING.

"Any traveller on the N.G.R. can see for himself that this is becoming an important industry in Natal. At present two (Nel's Rust and Mooi River) dairies seem to manage the major part of the work. There is, I understand, some talk of one or more new ones being started. Whether there is sufficient work for more I cannot say, but I very much doubt their being required at present.

"The introduction of cream separators has undoubtedly been of great advantage to Natal, and I trust that with the use of them the reproach of Natal rancids has gone never to return. A great deal has yet to be done before we have a really good Natal milk cow. Good milkers are to be found in most breeds, but I do not know of any one breed that can be said to be the breed for Natal. Every breed has some fault or defect. The Friesland or Holstein gives quantity, but very poor quality, of milk. The Channel Island may be said to be the perfect milk cow, giving both quantity and quality; but my experience is that the pure-bred animal is rather delicate, certainly it must have better treatment than a wet kraal to sleep in, and dry, harsh food to eat. My opinion is that we might have established an ideal milk cow for many parts of Natal, by a judicious crossing of the Channel Island and native cow. I would recommend a cross of Channel Island in all dairy herds, especially where butter-making is an object.

"From the public Press I see that under the pressure of retrenchment it has been thought necessary to do without our Dairy Expert. Whatever views we hold on retrenchment, I think that there will be but one feeling, and that one of regret that it should be necessary to do away with this department, which has done a great deal of good work during the term of its existence, and I am sure that all will sympathise very sincerely with the courteous and efficient officer who suffers under the scheme. (Applause.)

HORSES.

"Horses have commanded a fair price during the last year: their value was enhanced by the military requirements. During the last few years, probably owing to dry weather, horsesickness has not been very virulent. This year, I am sorry to say that it has been the cause of heavy losses to some of us; many valuable animals have been carried off by it. Inoculation of mules against horsesickness commenced in the Transvaal, and is now carried on by our own Veterinary Department. This promises to be a success; ¼ per cent. is all that have been lost from horsesickness amongst those treated. It is to be sincerely hoped that this inoculation will soon be extended to horses, and that our losses from this scourge will be greatly reduced. I think an impetus might be given to horse-breeding in Natal were our Agricultural Department to import a number of suitable entires; and either sell them by auction or arrange for them standing at convenient centres. The animals I would recommend are thoroughbreds of large girth, good bone, and not over fifteen hands. I understand such animals are to be had at a moderate figure. The importation of such animals might, I think, be done at little or no loss to the importers. In most parts of Natal the time has gone for large troops of horses; but if small farmers each kept one or two mares, which might be used for light work, our supply of horses might be increased with advantage to the farmers. One difficulty is the [illegible] of suitable entires, which might be obviated as I have suggested.

SHEEP.

"Sheep have thriven during the last year, though some farmers suffered through want of grass in the early spring; others complain of the appearance of jackals, which do great damage amongst the lambs. Cape Colony farmers have suffered very severely from the ravages of these pests. I trust some means of keeping them out of Natal may be found. Wool has maintained a high price, and is still in good demand. The value of wool exported from Durban in 1904 was over £289,000, in 1905 £408,000, in 1906 £536,000. This is a satisfactory increase, but unfortunately there is no means of determining how much was produced in Natal, and how much was merely passed through. An attempt is being made, assisted by the Agricultural Department, to introduce Persian sheep for slaughter purposes. I hope it may be successful for the districts where Merino sheep will not thrive. It seems impossible to get the Persian woolled sheep. If such could be obtained, and would thrive in the warmer regions of this country, they would be a boon to Natal.

MEALIES.

"The crop of 1905-1906 of this grain was generally poor; in some districts very little was reaped owing to droughts during January and February. The thorn and semi-thorn country suffered severely; perhaps a three-quarter crop was reaped by Europeans and a quarter by natives. Prices have been fair, the deficiency being supplied by stocks remaining over from the preceding year. The mealie crop in Natal is always an uncertain quantity, some years a considerable overplus, others merely enough for our own wants, and sometimes not even that. The present crop promises to be a heavy one; I trust a record one. Already there has been a good deal of damage done by hailstorms and locusts; but I hope these losses will not seriously affect the year's crop. It is hoped a market will be found in London for the surplus crop, and arrangements have, I believe, been made for cheap railway and ocean carriage.

The expected surplus has been estimated at nearly 1,000,000 muids. I hope that estimate may be exceeded.

SUGAR.

"The sugar crop suffered in the same way as the mealie crop from drought in the beginning of the year. Growers complain of very poor prices owing to the enormous crop of cane sugar in Mauritius, and the same of beet in Europe. The crop this season promises well, and should no untoward event happen a large crop may be expected.

WATTLE BARK.

"For some years there had been a steady increase in the output of this commodity. In 1906 the dry weather hindered the stripping of the trees, and the export fell from £112,666, in 1905, to £89,056 in 1906. In the near future there should be a very considerable increase. The price for 1907 is about £1 per ton higher than in 1906, and the season, so far, is very favourable, so growers are contented and cheerful, or at any rate ought to be so. The extent of land thoroughly suitable for the growth of the wattle is, so far as I can learn, somewhat limited. On that account it has rapidly risen in value, some having changed hands at prices varying from £5 to even £10 per acre. The wattle grows very freely, and generally gets very little care, but I believe few trees or plants respond more quickly to careful cultivation. The growth of the wattle is now a well established industry, and in many cases a profitable one. The great drawback is the long time of waiting for returns. The grower must be prepared to wait at least six years. A considerable amount of silver, or blue wattle, bark has been put on the market this season, and has found purchasers at some £2 per ton below the molissima. What use it is put to I do not know, but trust it is sold under its own name and not as molissima.

COTTON.

"Many attempts have been made in the past to grow cotton in Natal. These have failed, and the following amongst other reasons may be given to account for that failure. Want of suitable and reliable labour. Ignorance in those who made the attempt, of the insect pests which attack the cotton, and the proper methods of treating these pests. Some of the difficulties have been dealt with, and another attempt to make cotton an export is being made by Mr. John Kirkman, M.L.A., near Umzinto. Last year Mr. Kirkman reaped at the rate of 600lbs. of ginned cotton to the acre (400lbs. is considered a good crop in America), which realised over 6d. per lb. in the English market. This year he and his neighbour have planted some one hundred and fifty acres, which last month appeared most promising. I lay on the table a sample of this year's growth taken from the gin by myself, on Mr. Kirkman's place last month. The climate of Natal is peculiarly suited to the growth of cotton, April and May, the two months when cotton ripens, usually being a dry time. There seems no reason why cotton might not be grown in the midlands, and perhaps even the uplands of Natal. The soil required is generally speaking similar to that required for mealies. Mr. Kirkman estimates the cultivation of a cotton crop as costing 25s. per acre more than that of mealies. I do not advise any one to try cotton without studying the subject thoroughly, and giving the crop their constant and careful attention; in fact, I think all careless or slovenly farmers will do well to leave it severely alone.

FIBRE INDUSTRY.

"A commencement with this industry has been made near Port Shepstone, and those connected with it are sanguine that it will prove a remunerative undertaking. The most promising plant seems to be the *Fourcroya*. This plant is cut down every eight months, giving a crop from 1 to 2½ tons per acre, which produces some 3 to 6 per cent. of fibre, worth from £38 to £40 per ton. Upon the cost of preparation depends the question of whether it will pay or not.

FRUIT INDUSTRY.

"The season generally has been favourable to this industry. In some parts of the Colony peaches were a failure, and the mango crop was small. Other varieties of fruit have been fair in quantity and quality. For first quality fruit there is generally a fair demand. I trust the South African Exhibition will be a good advertisement, and that a market may be found in Britain for some of our fruits.

LUCERNE.

"The growth of lucerne is increasing throughout the Colony, and I hear of wonderful crops being reaped on suitable ground. From experiments I have seen I am inclined to think that it may be grown on ground which has not hitherto been considered suitable. In a book on its growth the astounding statement is made that the roots have been traced down to a depth of 189 feet. Its great value as a food for most kinds of stock is well known.

PASPALUM.

"This grass seems to be making headway; large areas are being planted. Should it fulfil the expectations of some, it will revolutionise Natal farming. So far as my observation goes, I have great hope that it will be of great value to cattle owners in the districts where it grows well. It seems as if it would be suitable for making ensilage as well as hay and general pasture.

ENSILAGE.

"This valuable product is not used in Natal so much as it ought to be; our climate suits both its production and use. Heavy crops suitable for ensilage can generally be grown in the autumn, and we all know how necessary it is to have a succulent food for stock of all kinds in the dry months, from July to October. Many make-shift methods of making ensilage have been tried, but so far as I have seen the only satisfactory plan of preparing it is to have a properly constructed silo built of concrete, or some such material. To save labour in getting it out, it is well to build this on the side of a hill, where, with the use of movable doors, it can be readily dropped into feeding troughs with the smallest expenditure of labour.

CHICORY.

"Amongst the minor industries which might be worth more attention than it has yet received is chicory. A Durban gentleman told me last week that he was ready to deal with one hundred tons years at about £17 per ton. Chicory requires light rich soil; the cultivation is somewhat similar to that of the turnip. Besides the marketable crop, there is a large quantity of green fodder which would be suitable for ensilage. The import into South Africa is of the yearly value of £13,000. To anyone seeking further information on this subject, I would refer them to the April number of the *Transvaal Agricultural Journal.* I lay on the table a few notes on the subject by the Durban gentleman already referred to.

EAST COAST FEVER.

"Since our last annual meeting this dreaded scourge has entered Natal (proper). Whether the late disturbances are wholly to blame or not I cannot say; but of this there can be no doubt, that the movement of cattle during the disturbances caused its rapid spread over a considerable portion of the Colony. The ignorance and incredulity of some people, who would not believe that it was anything but ordinary redwater or bushsickness, helped to spread the disease. The loss of whole herds of climatised Coast cattle was necessary to convince some that East Coast Fever was really in the Colony. From the notices on our agenda paper, a considerable portion of our time will probably be taken up in discussing what steps are necessary to hinder the spread of this disease. It may not, therefore, be out of place for me to make a few remarks on it. What I say is founded chiefly on material obtained from an address given by that able scientist Colonel Bruce, who has done so much in the way of investigating South African stock diseases. (Report of British Association, 1905, page 533.) Let us note some of the similarities and differences between East Coast Fever and Texan Fever or Redwater. These diseases are both caused by parasites, which enter the system of the animal attacked, multiply very rapidly, and destroy their victim. In East Coast Fever the parasite is called *Piroplasma Parvum*, in Texan Fever or Redwater *Piroplasma Bigeminum.* These parasites are both carried by the tick, East Coast Fever principally by the brown or tailed tick, *Rhipicephalus appendiculatus.* Redwater or Texan Fever by the common blue tick. One striking difference is that the East Coast Fever can only be carried by the very tick which has bitten a diseased animal, while Redwater is carried not by the tick itself, but by the young or larvae of the tick which had adhered to an animal suffering from the disease. Another striking difference is that an animal which has recovered from Redwater has in its body the latent forms of the disease, and is thus able to perpetuate and disseminate the disease; while an animal which has recovered from East Coast Fever, though immuned, does not carry any germs, and is harmless in the way of spreading or continuing the disease. The knowledge of the fact that the very tick which bites the diseased animal is the only known method of propagating East Coast Fever is of the greatest importance in dealing with the disease. For when once the cattle suffering from the disease die out or are killed, there remains nothing more to be done than to destroy the infected ticks, and then we are clear of the disease. This, unfortunately, is not always easily done, as the tick can live for many months in the grass. It is now generally agreed that grass must be burnt twice before it is safe to turn cattle into what was infected veld. Thus, supposing the East Coast Fever be now undr control, we must expect that eighteen months or thereabouts must elapse before it will be safe to take off restrictions in regard to the moving of cattle in Natal.

"I have just come from the district where East Coast Fever is rife, and what I have seen there makes me hope that we will give the matter most serious consideration before we recommend any relaxation of restrictions, however irksome these may be. (Applause.)

EXPERIMENTAL FARM.

"Since our last meeting Mr. Pearson has retired from his position as Director of Experimental Stations. Mr. Pearson was, I believe, a very hard working enthusiast; whether his style of working was not beyond our requirements or means is an open question. I trust his work will not be all lost to the Colony, and that we may yet reap some returns from his labour. Mr. Pearson has been succeeded by Mr. Sawer, who comes with very good credentials from Rhodesia. Mr. Sawer has favoured me with the following digest, which I trust will be of interest: "The Agricultural College is regarded as the hub of our system and organisation directed to furthering the work of instruction. Numbers have doubled since November last, and we have now reached the present limit of our accommodation with 28 students in residence. Arrangements are being made for the reception of additional numbers. Lectures are given during two days in the week, and practical instruction on the remaining four days by the Farm Manager, Dairy Expert, Carpenter, Engineer, Farrier, Orchardist, and Forester. After an eighteen months' course in general agriculture, students may proceed for six months to either our Coast station or to the irrigation block at Weenen, choice being determined by the probable character of their future work. At Cedara an additional area of 280 acres is being brought under cultivation in the vleis by means of subsoil drains, part of which will be placed under irrigation for rice and winter cereals. Data will be secured as to the costs and relative merits of different methods of draining. Butchers' steers, sheep, pigs, and poultry are being introduced with a view to giving students instruction in the feeding and management of all classes of stock, and as the basis of a series of winter feeding experiments.

" 'Improvement of native veld and re-grassing with imported species is receiving attention. Plots have been extended to the scale of field crops for the purpose of checking earlier results and securing ample material for the selection, testing, and distribution of farm seeds. Attention is being given to the cost of raising forage and feeding crops, and their value in terms of meat, milk, and wool.

" 'At Weenen a fire-curing tobacco barn has been erected, and an experimental crop of cigar, cigarette, and pipe-leaf is now being cured. This building will now be available for the treatment of tobacco grown by the settlers.

" 'A small factory is being organised in the same connection. This station will be conducted as a model irrigation farm, in the hope of raising the general standard of cultivation in the district. At Winkel Spruit further land has been cleared to allow of the organisation of tea, coffee, cotton, and fibre plantations, all of which crops are now represented. A study of the deterioration of tea-lands and coffee disease is in hand, and 35 types of cotton have been placed in Liverpool for commercial valuation. New varieties of sugar-cane promise satisfactory results, and will before long be available for distribution. Ramie, sisal, and Mauritius hemp should yield valuable data in the future. Though many of the above-mentioned undertakings have yet to reach completion, we should welcome members of the Natal Agricultural Union at any or all of our stations.'

BACTERIOLOGIST'S STATEMENT.

"The following is what has been supplied me by our able Bacteriologist, Dr. Watkins-Pitchford:—

" 'I fear I am not in a position to make any very startling announcement with reference to my work in disease research. Such matters move slowly even under the most favourable conditions for progress, and in the past such optimum conditions have not existed except to a very limited degree. It is hardly more than a year ago that I was successful in getting a single veterinary to help me in a field of unlimited extent, and as you know one more than 'white to the harvest.' The work of the last year, however, has shown more advance in research work than ever before, and my oft represented postulate that the 'results of such work will be in direct proportion to the facilities given for the same seems to have at last fallen on good soil. In the present Minister of Agriculture I am getting a full measure of help and support, and the outcome will be, I am sure, a justification of the more enlightened policy. My serious efforts must, as I have told my Government, date from the beginning of my opportunities in the year 1907. The work of calf disease is, I think, very hopeful, and I hope to be able to publish very shortly a report on this disease. I hope to do this within the next two or three months, but do not like to be too sanguine, as disappointments in such work are numerous. Horsesickness is also doing well, and definite progress has been made towards the production of a vaccine, but here again I look to the next year's work with its reasonable facilities as giving promise of a definite issue. The inquiry into blue-tongue in sheep is in much the same condition, so you see I am taking a much more hopeful view of the work of disease inquiry than I have ever felt justified in indulging in before. I feel that the consistent support and countenance given to the work by the Agricultural Union has been to a very great extent the factor which has caused a serious view to be taken of the importance of the work. The outlook is distinctly hopeful, and I think one would be justified in referring to it as such, and in advocating a continuance of the policy of encouragement which I fully believe the future will justify.'

STUD BOOK.

"Owing to the condition of the Treasury, it has been considered useless to make any attempt to get the necessary funds to enable Natal stock to be included in the South African Stud Book. I hope when better times return to the Colony that this will be seen to, and that Natal will unite with the other Colonies, and that there will be one Stud Book for South Africa.

INTER-COLONIAL AGRICULTURAL UNION.

"The second annual Congress of this Union was held in Capetown on the 30th and 31st May last. Natal was represented by Messrs. Alexander, Hancock, Craig, Holley, Moon, and Scott; other delegates were prevented from attending by the unsettled state of the Colony. His Excellency the Governor, Sir Walter Hely-Hutchinson, and the Mayor of Capetown, welcomed the delegates, and addressed the Union. The delegates were most hospitably entertained. The Minister of Agriculture and others organised several most enjoyable outings by rail, motor cars, and trams. On day was spent in visiting Darling where we saw a wheat producing country, the whole appearance of the soil being very different from anything to be seen in Natal. The next day we were taken to see the wine districts around Constantia. A copy of the proceedings lies upon the table. It will fall to you to elect delegates, and also to forward subjects to the next meeting, which is appointed to be held in Pretoria in August, 1907.

"I think we are all aware that this Agricultural Union has of late been the subject of a considerable amount of criticism. We have been accused of leaving our own field, and of having become too much a political organisation. Some maintain that the work we do is not to the advantage of the Colony, but merely for the aggrandisement of the farming community at the expense of the Colony. There may be some truth in these things; for it is difficult sometimes to say where our legitimate sphere comes to an end, and perhaps occasionally members have gone dangerously near the border line. That the Union, as a Union, has erred seriously in this matter I am not prepared to admit. It is, however, wise for us to learn from our critics, and we should always remember that here we belong to no political party, that we are neither Liberals nor Conservatives, that we are neither Imperialists nor Little Englanders; in fact, we know no party. We meet here to further the interests of agriculture, and in so doing we are striving to make this land in which we dwell a more comfortable and happy home for civilised man. The man whom we delight to honour is the man who can show us how to make two blades of grass grow where one grew before. The man we welcome here is the man who can teach us how to grow an extra muid of mealies or potatoes from an acre, without greatly increasing the expenditure on that acre. The man we want to see amongst us is the man who can teach us how to grow our own wheat at a price to compete against the world. The man we want to see here is the man who can show us what breed of cattle, and by what feeding, we can produce the best milk cow or slaughter ox. The man we want amongst us is the man who can teach us what breed of sheep will thrive best, and produce the most and the best wool and mutton. The man we want here is the man who can teach us how best to cultivate the sugar cane or the black wattle, that they will give the best results for the labour bestowed upon them. The man we want is the man who will either bring us from over the ocean, or produce by his study and labour, the tree that will bear the best and most fruit. The man we want among us is the man who tells us what breed of fowls and what treatment of these fowls will give the best supply of eggs and the best table fowl. The man we want here is the man who will teach us how to dip or spray our cattle so that we may get rid of the tick at the least expense, and in the most humane manner; humane to the cattle, not to the tick. I might go on for a long time with a description of the men we want. I would repeat again that as an Agricultural Union we care not what party a man belongs to in politics; what we do want is that he seeks the advance of agriculture, and is willing to throw his quota into the common stock of knowledge which will lead on to development for the common good.

"In conclusion, I desire to give my best thanks to the members of the Executive for attendance at meetings of committee and general interest in the work of the Union. It is almost superfluous to say a word in regard to our secretary, Mr. Eadie. His devotion to the Union and the amount of work he does for it is far beyond any praise I can give. I trust he will long continue his valuable services, and give the same assistance to my successors that he has given to me." (Applause.)

Mr. King seconded the adoption of the report, which he said had been listened to with great interest.

Colonel Friend Addison, while generally approving of the President's address, objected to the pessimistic note it contained. He objected in particular to that portion of the report which declared that Natal had all the stock diseases of the world, and that all but a small percentage of the land was bad. It was true they had rinderpest, lungsickness, redwater and gallsickness, but they knew how to treat these disease. East Coast Fever they had not yet overcome. They had cried "stinking fish" long enough. ("Hear, hear.")

Mr. John Kirkman, the Hon. R. M. Archibald, and others also spoke, echoing Colonel Addison's sentiments regarding the pessimistic tone of the address. Some discussion then took place as to whether the report should be "adopted" or "accepted"; and it was finally moved and agreed to that the meeting pass to the next business on the agenda paper.

EXECUTIVE COMMITTEE'S REPORT.

The Executive Committee's report for the year ending 31st December, 1906, as follows, was then adopted:—

"Strict economy has been necessary during the past year on account of the heavy drain on the funds during recent years. The Executive has not seen its way to recommend an increased subscription, and the only method of keeping within our means is to cut down expenditure. With this end in view the Committee recommend the annulment of the resolution requiring copies of the proceedings to be distributed to all members of Associations. It is considered sufficient that four copies should be sent to each Association.

"Three new Societies have applied for affiliation, which has been granted, viz.:—Charlestown Farmers' Association, Umvoti Farmers' Association, and Acton Homes Farmers' Association. Certain Societies, however, have not paid subscriptions for several years, and the Executive recommend that these Associations be notified of their arrears and be requested to inform the Secretary whether they desire to be continued on the roll of the Union. The Committee is aware that the times are not favourable for calling up arrears, but, on the other hand, the Union must have a sound financial position, and this is only attainable by erasing from the roll all Associations who are not likely to meet the charges against them.

"Financial.—The balance sheet shows a balance of £7 18s. 2d carried forward to 1907, but this was only possible by allowing certain charges to remain unpaid. These have now been met, and as will be seen from statement (B) Appendix III., after paying all charges and taking into account the subscriptions that had come in up till February 28th, the date to which the statement was made up, there was a surplus of £63 9s. 2d. to carry on the work of the year. Statement (C) is an estimate of income and expenditure for remainder of the year. This shows a credit balance of £11 8s. 2d. Of course it is assured that all Societies will pay their subscriptions, and it is anticipated that £10 10s. of arrears will be collected.

"Forestry.—The prizes offered by Mr. Maurice Evans, M.L.A., for forestry have only brought out one competitor. It now lies with the Union to place the results before Mr. Evans and obtain his views on the subject.

"Government Schemes.—The Minister of Railways and Harbours (Hon. C. Hitchins), and the Minister of Agriculture (Hon. W. A. Deane), wish the Union to appoint a time for hearing statements upon the export of mealies and the utilisation of the Government Cold Storage Works. If it is the pleasure of the Union the evening sitting of the first day of the Conference might be set apart for this purpose.

"The Committee have to thank the Mayor and Corporation of Maritzburg for their kindness in giving the use of the Supper Room of the Town Hall, free of charge, to the Union for its meetings. In connection with last meeting of the Union also the charge was remitted. This action on the part of the Corporation, combined with the sympathetic interest taken in the meetings of the Union by the Mayor and Councillors, will gain the hearty approval of the Union as a whole."

BURR WEED.

Mr. Mitchell, who formed one of a deputation which waited on the Minister on the subject, stated that the Minister had promised that no prosecutions would be instituted in connection with the Burr Weed Act until he had had an opportunity of introducing fresh legislation. Mr. Mitchell referred not to thistle but to the ordinary burr weed.

NORTHERN DISTRICTS SECESSION.

Mr. Van der Spuy (Utrecht Association) asked for leave to make an explanation of a personal nature. He made reference to a telegram which had been sent by the Utrecht and Dundee Associations to the Prime Minister of the Transvaal, expressing the desire of the people of Utrecht to come under the Transvaal Government. He said that the Association in question had no authority for the statement made regarding the feelings of the Utrecht people. It placed the Vryheid and Utrecht delegates in a false position. They wished to be distinctly understood that they were in no way responsible for the action of the secretaries of the Associations referred to.

LAND TAX.

It was moved that the following resolution should be once more placed before the Government:—"That, in the opinion of this Union, the time has arrived when a substantial tax should be imposed on all lands in the Colony not beneficially occupied,"

CALF DISEASES.

Mr. Alexander (Richmond Road Association) spoke very strongly on the subject, and urged that the necessity for moving in the matter of investigation be impressed upon the members of the Legislative Assembly. He read the following letter which he had received from the Government Bacteriologist:—

"In reply to your letter of the 5th inst. concerning the resolution passed at the last meeting relative to facilities for research into stock disease:

"I have pleasure in stating that the Minister of my Department has recently made arrangements for the addition to my staff of another veterinary assistant, and has further sanctioned the provisional addition to the Estimates of a more adequate sum than has been available in past years for the carrying on of this important work. He has also expressed his intention of still further extending facilities as such need becomes obvious.

"As you are aware, we have been much behind other countries in the past in the provision we have made for carrying on the work of research.

"It must necessarily take some time before any increase of facility bears practical result, inasmuch as the work of investigation into disease-conditions is generally laborious and lengthy.

"I feel confident, however, that the near future will show the wisdom and advantage of the extended facilities which the Government is granting to promote so important a work.

"In regard to your query concerning the progress of the enquiry into Calf Disease and Horsesickness, I am able to inform you, as regards the former, considerable progress has been made, and that I hope to be in a position shortly to issue a report of the work undertaken in this direction, which I trust will prove of use in controlling this destructive disease.

"As regards Horsesickness—though not able to make an immediate pronouncement—I am sanguine that I shall very shortly be able to issue a report on the progress of this enquiry, and, I trust in this direction also, to make suggestions regarding the more efficient prevention of the disease.

"With regard to Blue-tongue in sheep, I hope to be able to issue a vaccine for its prevention in time for next season.

"All the above enquiries are of a hopeful nature, and I trust that, with my increased facilities, I may be able to push one or more branches of this work to a successful issue before another annual meeting of the Union, to which body I have reason to be grateful for past encouragement and support in the pursuit of enquiries often tedious and difficult."

Mr. Alexander moved:—"That this Agricultural Union begs to urge on the Government the desirability of continuing to give the Bacteriologist the fullest facilities to carry out investigation in the cause and cure of stock diseases and fowl-sickness; and that every encouragement should be given him to try to discover a means of prevention, amelioration, or eradication of these diseases, and that it be an instruction to the

Executive Committee of this Union to continue to press the matter not only on the Government, but on the Legislative body of this Colony."

Mr. Deane (who, with various officers of the Department of Agriculture, was present), said that Mr. Pitchford had received the assistance he had spoken of, and that he was also going to receive the monetary assistance he asked. He added that the veterinary surgeons would in future be engaged in investigational work more, and not so much in doing ordinary stock inspectors' work.

Mr. Alexander's motion was put and carried.

MANGE IN HORSES.

A short discussion here took place on a question raised by Mr. Woods as to whether the replies furnished by Government to the resolutions of the last Conference were sent by the present or by the late Ministry, and whether, in the latter case, the present Government would adhere to any assurances given or statements made by their predecessors.

Mr. Deane reminded the meeting that the present Government had only been in office a short time, and could not be expected to endorse everything that had been said by the late Government.

The following resolution, relating to mange in horses, which had already been sent to the Government, then came before the meeting:—"That, in the opinion of this Union, the laws relating to Mange in Horses is quite inadequate to cope with the evil, therefore the Government be urged to bring in legislation with a view to having Mange in Horses brought under an Act, the same or as near as possible to the Scab Act." The reply of Government to this, in 1905, had been that a Bill on the subject had passed the Legislative Assembly, but had been thrown out by the Upper House.

Mr. Hancock moved that the words "the same or as near as possible to the Scab Act" be deleted and the following substituted: "to deal effectually with the disease."

During the course of the discussion which followed, it was stated by one speaker that the Police in his district had told him that they had no right to interfere with mangey horses on the road. Natives in the locations did not trouble to report mangey horses.

Mr. King was of opinion that the present Contagious Diseases Act was quite sufficient to meet their purpose. What was wanted was a more efficient system of inspection of horses.

Mr. Wiltshire said that power to compel quarantine and treatment was required. At present a native can keep mangey horses at his kraal.

Mr. Hancock's amendment to the original resolution was carried unanimously.

UNIFORM WEIGHTS AND MEASURES.

A considerable discussion took place with regard to the necessity for standardising weights and measures throughout South Africa. It was stated, in reply to a question, that, at the Inter-Colonial Conference, resolutions had been passed that all grain should be sold by the hundred pounds.

It was pointed out that the Natal Government Railways were mulcted to a certain extent by the difference between the weights used in the Transvaal and those in vogue in Natal.

Mr. Deane said that if the packages were all sacks the matter would be much simplified. He added that, under the Government mealie exportation scheme, the grain would be shipped in 200lb. bags—not 203lbs.

Mr. Mitchell pointed out that the Chambers of Commerce would only buy the 203lb. sack. He said farmers should combine and only sell at 200lbs. If they would determine not to sell save by the 200lb. bag, the Chambers of Commerce would be forced to yield. How the Government was going to help them in the matter, he failed to see. The remedy lay in their own hands.

Mr. Crompton moved, and it was carried, that the other Colonies of South Africa be consulted with a view to bringing about legislation for the standardising of South African weights and measures, the weights of sacks and packages to be left out of consideration.

TENANTS' COMPENSATION BILL.

It was agreed that the resolution on this subject be returned to Government, for the purpose of its being again brought before Parliament.

HORSESICKNESS.

The following resolution, which had been passed by the last Conference, now came before the meeting:—"That, in the opinion of this Union, the Natal Government should approach the Transvaal Government with a view to introducing the system for immunising horses and mules against Horsesickness." To this the Government had replied that it was still in communicaton with the Transvaal Government on the subject.

A request was made by Mr. Dick for the correspondence to be published, or that some information be furnished. Mr. Woollatt stated that, although they had been immunising mules in the Transvaal for about a year, the Transvaal Government was not prepared to issue the serum on a wholesale scale prior to September last. The Natal Government had not been disposed to inoculate mules for private individuals, for the reason that, if they had done so, it would have brought the system into disrepute. Many mules already had the disease, and if they died people would be inclined to blame the system of inoculation. They had immunised some 800 Government mules in Natal during last summer, and this winter they hoped to carry out immunisation on a large scale. In the Transvaal they had lost only 17 out of 5,000 mules, and in Natal, as far as they knew, the loss was three out of 800.

Mr. Deane said that Mr. Pitchford hoped this year to be able to issue a vaccine to immunise animals for one season if not for a longer period.

Mr. Alexander remarked that Dr. Theiler had told him it was possible to immunise a mule for one district, but that if it were moved to another district it might die of the disease.

Mr. Woollatt said the mortality this year from Horsesickness had been appalling. In the up-country districts and in the high veld, the mortality had been higher than in the low veld. In a season such as this, the present system has proved itself a success.

One of the delegates remarked that the practice of immunising mules had been going on for years; and stated that a preparation was placed on the market by the Cape Bacteriologist some years ago.

Mr. Woollatt replied that Dr. Edington's preparation had never been taken advantage of.

It was stated that Dr. Edington, who had been away from South Africa, had returned and had registered himself in the Transvaal as a medical practitioner. The preparation in question, it was averred, was recognised in the Cape Colony as a cure.

Mr. Dick's motion, "That this Government publish the correspondence with the Transvaal on the subject of Horsesickness," was carried.

THE POLICE FORCE.

Mr. Alexander moved:—"That this Union is of opinion that the Natal Police should be instructed in the native language, customs, and habits, and that facilities be given them to also acquire a knowledge of the Dutch language."

Mr. De Waal, in seconding the motion, said that if the men were given greater encouragement to learn the Dutch and native languages, they would become more efficient.

COLOURED RAILWAY PASSENGERS.

The Conference then proceeded to deal with the resolutions passed at a special general meeting of the Union held on the 10th October, 1906.

On the motion of Mr. Van Rooyen, it was agreed Government be asked to take steps to have certain compartments labelled, "For coloured passengers only."

LAAGERS.

In reply to a resolution urging the Government to take steps for the erection of laagers in certain parts of the Colony, Government had stated it was of opinion that temporary laagers of barbed wire erected as required were preferable as a rule to permanent laagers.

Mr. Van Rooyen considered that Government ought to reconsider the matter; and moved that the resolution be sent back to the Government.

The motion was carried.

LIFE MEMBERS OF THE UNION.

Mr. Mitchell moved:—"That the ex-Presidents of the Natal Agricultural Union shall be eligible to be elected by a two-thirds majority as life members, with power to take part in all meetings of the Union. Mr. Hosking seconded; and the motion was carried by 32 votes to 24.

CLOSER SETTLEMENT.

The Nottingham Road Farmers' Association moved:—"That this Union is surprised that the Closer Settlement Committee has not approached the Union to obtain the support or opinion of the farming community with regard to the all important question, and that two delegates from the committee be invited to attend the Union and discuss the question."

The Secretary read a letter from the Closer Settlement Association, in which it was suggested that three delegates might be received by the Union.

Mr. Alexander thought the time had arrived when this thing should be thrashed out with the Closer Settlement Committee, and the public be shown that the attitude of the farmers was not a selfish one, but that they wished to prevent harm being brought to the Colony by the rash schemes that were being propounded. He was of opinion that three delegates should be invited.

After some discussion, it was agreed to invite three delegates of the Closer Settlement Association.

DUTY AND RATES ON SEED.

The Newcastle Agricultural Society moved:—"That the duty on seeds of all descriptions should be remitted, and that the railway rates for transit on such seeds should be reduced to Colonial produce rates."

Mr. Johnstone, in moving this resolution, pointed out that the growing of potatoes in up-country districts was practically an impossibility at the present transit rates. He was of opinion that the duty should be removed from all stuff imported for seed purposes. The argument of the late Government against such a proceeding had been that some merchants used to import potatoes certified as for seed purposes and sell them for consumption as food. The matter would, of course, cause the Government some trouble, on account of its being one of the parties to the South African Customs Union. The potatoes in question were, nevertheless, only for use in Natal. As regards railway rates, the matter was solely in the hands of the Natal Government.

Mr. Wood supported the motion. With a Customs import duty of 2s. per pound on imported seed, potato-growers up-country were severely handicapped. Good seed potatoes were not obtainable in Natal. It was absolutely necessary, in the interests of the industry, to import seed every two or three years. Apart from this, the rail carriage on seed from Durban was enormous.

Other speakers opposed that part of the motion relative to the remission of the duty, on the grounds that it would not be conducive to the local production of seed potatoes. It was also contended that potatoes might be imported as for seed, and then sold for consumption. This, it was stated, was done by some merchants before the imposition of the duty.

Mr. Mitchell recommended a consideration of the question whether they could not produce their own seed potatoes by exchange. He suggested that they should enter into an agreement amongst themselves for this purpose.

Mr. Sawer (Director of Experiment Stations) announced his intention of importing no more seed for planting at Cedara as he was arranging with the other Experiment Farms at Weenen and Winkel Spruit so as to grow their own seed. He also stated that he was putting 500 or 600 bags of potatoes in cold storage for experimental purposes, in order to determine times of keeping them in cold storage.

The motion was lost by 34 votes to 25.

NATIVES AND SQUATTING.

Mr. Kolbe, on behalf of the Slangrivier Boere Vereeniging, moved: "That, in the opinion of this Union, the time has come when the Government should cause a law to be passed forbidding owners, renters, or occupiers of any farm or farms from allowing natives or coloured persons to live upon their farms without a written contract."

Mr. Von Levetzow thought it was desirable to make a native liable to punishment for living on a private farm without having entered into a contract.

Mr. Kirkman was of opinion that all matters relating to natives should be left over until they had heard the results of the Native Affairs Commission.

It was pointed out that there was nothing to prevent a farmer from entering into any contract with his natives. On the other hand, it frequently happened that a native would prefer to go on to the next farm rather than enter into a contract.

Mr. Van der Spuy said there must be a law. It was necessary that all the farmers in a district should make a contract with his natives, so that natives could not desert.

Mr. Geo. Coventry was of opinion that every man should be compelled to adopt such a system. Further, they should not lose sight of the fact that Ordinance No. 2 of 1855 was still in existence. Had it been carried out from the commencement, the trouble that farmers had had with natives would never have existed.

Mr. King pointed out that a native could leave a farm at a week's notice, but that a farmer could not put a native off his land without six months' notice.

Mr. Archibald said that when they put rent against labour, trouble would always arise. No matter what contract was made, natives would still break away and go where they could make better terms for their labour. He thought rent for the land their cattle fed upon should be charged, and wages paid out of it; which was the Coast custom. He did not see why the compulsory signing of contracts should be made universal, as there were districts where no trouble was experienced.

After some further discussion, the motion was carried by 29 votes to 19. A rider was added to the effect that the resolution be forwarded to the Native Affairs Commission.

TOBACCO FACTORIES.

Mr. Uys moved:—"That, in the opinion of this Union, the time has arrived when the Government should establish tobacco factories in the Colony."

He said factories were wanted in Natal. Tobacco would grow from the Northern Districts to the Coast. It was used for many purposes besides smoking.

Mr. Blaker thought it was too much to ask the Government to establish such factories, but they might ask for assistance in their establishment. He pointed out that the Government were experimenting at Weenen, and advocated waiting for the results of those experiments before moving in the matter.

It was pointed out by one delegate that it had been proved that tobacco would pay. There were several private enterprises that were now turning out tobacco successfully. He did not consider it right to ask Government to establish factories and compete with private concerns. The success of the industry was proved.

Mr. Kirkman was of opinion that all factories established should be aided by Government.

Mr. Sawer (Director of Experiment Stations) explained that in Rhodesia, where he had been, they gave up growing inferior tobaccos for kafir snuff, dip and similar purposes. They also decided to concede an amount in weight in order to get the compensation of superior quality. Having a uniform system of cultivation, they proceeded to go in for a uniform leaf and a uniform system of handling. The assistance which the Government gave was in the direction of warehouses—not factories—in four different centres. They found it did not pay them to grow a poor leaf. For certain Turkish cigarette tobaccos they received as much as 2s. a pound. He had just returned from Weenen. Those irrigation settlements were particularly suitable for the cultivation of tobacco, which could be cured at one point. Green tobacco could not be transported more than ten miles. Splendid tobacco was being grown in Natal; but better seed, a better system of manuring and more suitable means of curing were required. He did not consider there was any need for factories yet.

Mr. Deane said no resolution was necessary asking for the establishment of tobacco factories. If the Colony could produce the tobacco on co-operative lines, they could count upon the assistance of the Government. That was the policy of the Government.

After a little further discussion, the following motion, which took the place of the original motion, was put to the vote:—"That the time has arrived when Government should assist the farmers of the Colony, either by establishing a tobacco factory or by subsidising any factories which may be established by private enterprise."

The motion was lost by 27 votes to 15.

EAST COAST FEVER.

Eight resolutions appeared on this section of the agenda paper under the heading of East Coast Fever.

A motion brought forward by the Seven Oaks Association was included in one from the Nottingham Road Association; and Mr. King, on behalf of the latter Association, moved:—"That, in the opinion of this Union, and in view of the presence of East Coast Fever in Natal, the Colony should be divided into districts. In each district there should be an advisory board appointed to advise and assist the Veterinary Department in devising the best means of suppressing the spread of the disease, and for the best means to be adopted for the local management of cattle in the various districts."

In explaining the reasons of his Association for bringing forward this motion, Mr. King said the management and details would be far better left to the local board, everything being referred to the Department for approval. The District Veterinary Surgeon would necessarily be one of the board; and with his advice the board would be of enormous assistance to the Department in Maritzburg.

Mr. Van Rooyen supported the motion. He considered the restrictions imposed would be carried out more strictly than they could be under the control of the Veterinary Department. The farmers were going to be the losers where there was to be any loss, and it was to their interests to act carefully.

Mr. Deane was of opinion that the motion was of no value. Apparently the members of the Northern Districts Association had not read the amending Act passed last session. In that Act the necessary provision was made. He pointed out that an Advisory Board could not be invested with executive powers. They could only advise the Minister of Agriculture. The advice given by the boards up to the present had in nearly every case been acted upon. Some members of the committees, the Minister continued, had not been quite discreet in issuing passes. An advisory committee was only an advisory committee. Who was to be responsible for their mistakes? The country would suffer. The country east of the main line of railway and south of the Cape-Natal line was already divided into districts, where advisory committees had been formed.

Mr. King pointed out that those boards were unsatisfactory, as they had no appointed times for meeting. He considered they should be put on a proper footing.

The motion was carried by 36 votes to 4.

The remainder of the resolutions regarding East Coast Fever were held over until after the hearing of the Minister for Railways and Harbours and Agriculture, on the subject of the export of mealies.

EXPORT OF MEALIES.

At the evening sitting (10th April) Mr. Hitchins (Minister for Railways and Harbours) and Mr. Deane (Minister of Agriculture) addressed the meeting with reference to arrangements the Government had made in regard to the export of mealies.

A special article on the subject appears in another portion of this issue.

CENTRAL MEALIE GROWERS' ASSOCIATION.

Mr. Alexander, on behalf of the Richmond Association, moved:—"That this meeting of the Agricultural Union considers that the time has now arrived to establish a Central Mealie Growers' Co-operative Union to deal with the staple crop of this Colony, and that a committee be formed from the delegates of this Union to draw up a practical scheme for the formation and working of such a Mealie Growers' Co-operative Union."

He wished to thank the Government for the action they were taking in the matter of the export of mealies. He welcomed their proposals, as he believed they were going to do a great deal of good for the Colony. It gave him pleasure to say so, because he might later on require to criticise them. It was very desirable that a growers' association be established to go into all the details. The Government had gone a certain distance in making arrangements, but the remainder should be left to the farmers. All he asked was that the meeting should affirm the principle and form a committee to undertake the work, to include ten or twelve, with the new President of the Conference to take the chair.

Mr. Hancock hoped the resolution would not be passed. The Government, having commenced, should be allowed to carry the matter through to its completion. He considered it would hamper the Government to in any way interfere with the scheme, which was a very feasible one, and from which the farmers would reap much benefit.

Mr. Van Rooyen considered the motion was a step in the right direction. Government would be sure of good mealies, as the proposed Union would take care not to accept mealies that were not fit for exportation.

Other delegates spoke, some in favour of and others against the idea.

The Minister for Agriculture, on being appealed to, said the Government would welcome a union of the nature suggested by Mr. Alexander.

Mr. Alexander said that the idea was that the union should take over the export of mealies to England and elsewhere. He wanted a growers' union, to work with the Government. It would enable them to work out the details, and to tender for large supplies, which they could not do as private individuals. The union would charge a small commission on the mealies exported, and would otherwise be conducted on thorough business-like lines.

The motion was carried by 49 votes to 4.

CENTRAL FRUIT GROWERS' UNION.

Mr. Alexander moved:—"That this meeting of the Agricultural Union considers that the time has now arrived to form a Central Fruit Growers' Co-operative Union to advance the export of fruit from this Colony, and that a committee be appointed from the delegates of this meeting of the Union to draw up a practical scheme for the formation and working of such Central Fruit Growers' Co-operative Union."

The same arguments, he said, applied to the formation of a fruit-growers' union as to the mealie-growers' union. There was on the Coast a fruit-growers' association, but he did not see any reason why the two should clash. If fruit was to be exported from up-country, it was very desirable that they should have an association more in touch with up-country growers than the Coast association could be.

The motion was seconded, and carried unanimously.

EAST COAST FEVER: COMPENSATION.

Mr. Van der Spuy moved, on behalf of the Utrecht Farmers' Association:—"That, in the opinion of this Union, farmers residing in districts infected by the East Coast Fever, and suffering under and by reason of restrictions laid down by the Government, should receive more substantial assistance from the Government."

He argued that, if there should be any loss, no one district should suffer more than another. The loss should be sustained by Government, and so by the whole Colony.

In connection with this matter, Mr. Thole brought up the question of fencing material and mules. He said an applicant for Government assistance in that form had to make oath that he could not get anyone to lend him the money he required. A farmer, he said, could always get *someone* to furnish the money, and so he could not make oath without committing perjury. He considered that Government was giving no assistance to the farmer, and he would therefore support the motion before the meeting.

Mr. Johnstone sympathised with the mover of the resolution. He illustrated what was done by the Government for the farmers when Rinderpest broke out in 1896. Oxen were lent. All the farmers borrowing had to take oath that those oxen would be returned after two or three years, when called for. Most of the borrowers purchased those oxen. Why could not that be done now? Let them lend these men the animals to do the work, and at the end of a certain time let those animals be returned.

Mr. Deane said Mr. Johnstone had explained what the Government had done in the Rinderpest days. The present Government was doing exactly the same thing. Government was empowered by the Act to spend £100,000 in assisting poor farmers. Some 1,500 mules had been purchased, and many of these had been allotted. Government had to pay £22 10s. for the mules. Immunising them cost £1 a dose; and a certain number had died.

Mr. Woollatt (Principal Veterinary Surgeon) next spoke. He said that every mule was tested, and he was satisfied that it was free from Glanders. In Vryheid district the farmers would have mules that were not immunised. He made a practice now of not issuing any mules that had not been immunised. He expressed his willingness to replace any mule dying after it had left his hands, providing it could be proved that the infection took place before the animal was issued.

After some further discussion, the mover (Mr. Van der Spuy), upon being called on to reply, said that since the Rinderpest days of 1896, the people in his district had had hardship after hardship. Repatriation cattle had been bought, and were not yet paid for, and those cattle were now lost. The Minister of Agriculture said they must buy mules at £25. If a man bought eight mules, for example, there was another £200, and so the debt grew. If there must be a loser, let the Government be that loser—not the individual people. The Minister had said they were not thankful; they *were* thankful for everything the Government had done.

The motion, on being put to the vote, was carried by 19 votes to 12.

E.C. FEVER: STAMPING OUT.

The Hatting Spruit Association moved:—"That, in the opinion of the Union, that should any herd of cattle become infected with Tick Fever, it should be made compulsory for the owner to sell same for slaughter purposes, if he cannot supply sufficient clean veld for temperature camps, and sufficient clean veld for grazing purposes, after having passed through the temperature camps, the Government to fix schedule price and take over such cattle, and that all infected areas be fenced."

At the present time, it was explained, the Veterinary Department had not the power to deal with infected herds that it ought to have. As long as cattle were kept on private land, they could not be touched under the Contagious Diseases Act.

Mr. Tandy thought it would be a good plan for three or four owners of contagious farms to pool their cattle or pool the risk of sickness. These farms could then be treated as one farm; and in that way the small owner would not be at any greater disadvantage than the large owner. For instance, if the disease broke out on one farm, the cattle not infected could be removed to whichever of the neighbouring farms was clean. Another point was that, under the latter portion of the motion, the Government could fix a schedule price and take over the cattle.

In a discussion regarding the position of the native in the matter, Mr. Jas. King said that, so far as the locations were concerned, they should be fenced in; then, if the cattle wished to die, let them die. But the native residing on private land should be dealt with in precisely the same way as the white farmer himself.

Mr. Deane explained that the powers asked for by the resolution were asked for by the Government during the last session of Parliament. The only way was to remove cattle from the land. He stated that the whole of the native locations were now fenced; and he pointed out that Europeans and natives were both selling cattle to the contractors' buyers.

The motion was carried by 40 votes to 5.

E.C. FEVER: FENCING.

The Hatting Spruit Association brought forward the following motion:—"That it is the opinion of this Union all native locations should be fenced, and that the funds of the Natal Native Trust be used for this purpose. That all farms should be fenced in, and owners to be given a specified time to do it, failing which, the Government should have the right to fence and charge to the owner or owners."

Mr. Tandy said the first portion of the resolution had been disposed of by Mr. Deane's statement that locations were being fenced. With reference to the second portion, he said fencing was necessary, as many herds in a district got mixed through the carelessness of the herd boys.

After a short discussion, the motion was put to the vote and carried by 19 to 10.

This terminated the first day's proceedings. A report of the second day's proceedings will be published in the next issue of the *Journal.*

(*To be continued.*)

Of all the nations of the earth, Americans are said to consume the greatest amount per head of sugar and its by-products.

The idea that docking a horse's tail strengthens his back is a very old one. Gervaise Markham, the great authority on horses 250 years ago, says: "The curtayling of horses is used in no nation whatsoever so much as in this kingdom of ours, by reason of much carriage and the heavy burdens which our horses continually are exercised and employed; withal and the rather since we are strongly opinionated that the taking away of these joints doth make the horse's chine or back a great deal stronger and more able to support a burden, as in truth it doth; and we daily find it so by continual experience.

Experiment Farms.

CEDARA.

To Director Experiment Stations.—

Since submitting my last report, a continuation of the wet weather then prevailing has predominated, and the total rainfall from 1st July, 1906, to 31st March, 1907, has now exceeded 35 inches, as compared with the corresponding period of last year, when 24 inches was recorded.

The rainfall for the month has been 4·86 inches, and the maximum and minimum thermometer readings have been respectively 90 degs. and 49 degs.

A very sharp and severe hailstorm (but fortunately of short duration) was experienced on the afternoon of the 28th ult. Very little damage was done to the crops beyond the leaves being somewhat torn and shredded. Considerable damage, however, was done to the buildings, the College suffering most, having many panes of glass broken. On the 30th ult. another storm passed over, which was of longer duration but not so destructive. No damage was done.

The work of harvesting the various crops has been considerably hampered owing to the incessant rain, which has necessitated the removal of the men to other work continuously, it being impossible to continue harvesting the crops in the rain or while they were still wet.

The following crops were harvested during the month:—

1. Soy Beans for Fodder, which were planted in the "Distance of Planting" Maize Section, show corresponding section averages, in the case of Sections X and Y, while the average for Section Z is a trifle over 50 per cent. better, as the result of subsoiling.

The alternate rows, which were left to mature grain, will be harvested during the current month, when the report thereon will be submitted.

2. Potatoes: Distance of Planting Section.—The results of this experiment are extremely interesting as well as encouraging. The sets used in this experiment were ¾ oz., 1¼ oz., 1¾ oz., and 2¼ ozs., planted in drills 2 feet 8 inches apart, and planted at distances of 9 inches, 12 inches and 18 inches in the respective plots, each section being planted with alternate dressing of light and heavy manuring, the light dressing consisting of 170 lbs. Sulph. Ammonia, 300 lbs. H.G. Super., and 100 lbs. Muriate of Potash per acre, the cost of which was £2 11s. 4d., and the heavy dressing being double this amount. The results vary from 12,240 lbs. per acre to 24,200 lbs. per acre.

There has been a steady increase in the results of this section since its first cultivation three years ago, which increase is due to the repeated dressings which have been applied from year to year in the same proportion.

The variety grown was "Up-to-date."

3. Potatoes in Manures Section.—This comprised the results of various treatments of what are termed the Superphosphate and Slag Sections, Sulphate of Ammonia being applied with Super. and Nitrate of Soda with Slag. The result was in favour of the latter, which gave an aggregate of 7,425½ lbs. to the section, while the former gave as a result 7,065¼ lbs.

The highest yield on the Slag Section was from a dressing of complete manure, viz., 448 lbs. Nitrate of Soda, 600 lbs. Slag, and 300 lbs. Muriate of Potash per acre, 13,230 lbs. per acre being obtained.

4. Millet Manure Section.—On the Millet Section the highest yield was obtained from the plot receiving a dressing of complete manure, viz., 170 lbs. Sulph. Ammonia, 200 lbs. Superphosphate, and 80 lbs. Muriate of Potash. The area was 1-20th of an acre, and produced 1,077 lbs., being at the rate of 10¾ tons per acre. Variety, *Frumentaceum giganteum.*

5. Manure Section of Rye.—The medium dressing of complete manure again produced heaviest yield of dry forage; over 2½ tons per acre.

6. Manure Section of Oats.—A heavy dressing of complete manure on this section produced at the rate of 5 tons 1,740 lbs. per acre of Algerian oats, while a similar section planted with Indian oats produced only half that weight of dry forage.

No increased yield was given on the Cultivation Section from subsoiling; in view of the thin nature of this particular piece of land (ironstone) the result was as expected.

The following crops have been planted, in connection with which the necessary ploughing and preparation of the land has been attended to:—Turnips, rape, buckwheat, lupines, barley, soy beans, rye, prickly comfrey, oats, tares, mustard.

Hay-cutting has received special attention on every occasion when the weather would admit; and, although the hay has been carefully stacked in small ricks on the ground, it is feared a good deal of it has been badly spoiled.

The Stockman reports:—

Horses: The same as last month, viz., 9, with an additional 5 still on loan from the Militia Department.

Mules: Five. One died of horsesickness.

Oxen: Same as last month, viz., 38.

Sheep: One ewe has been sent to the Bacteriologist, Allerton; one has died of snake bite; and a ram got severely worried by dogs and died from injuries received. Five lambs have been born. The total number of sheep at the end of the month was 2 rams, 39 ewes, and 7 lambs.

All the sheep were hand-washed with Cooper's dip on the 7th Fifteen ewes have been drawn off the pure bred flock for extra feeding, the ration consisting of ½ lb. oats., 1-3rd lb. soy beans, 1 lb. maize silage, and 1 lb. oat straw each daily. Fourteen pure bred ewes have been turned in with the graded flock, but are getting no extra feeding.

One ram (getting a daily ration of 1 lb. crushed mealies, ½ lb. soy beans, 1 lb. maize silage, and 1 lb. oat straw) is put to each flock on alternate days. The ram was put to the "No Ration" flock on the 26th. Eleven ewes have been mated, and 12 in the "Rations" flock.

Four students were working with the Stockman during the month, particularly at hay-making, and he reports that they are good workers, diligent and attentive.

The Blacksmith has been mainly occupied in overhauling implements and machinery, also attending to incidental repairs, etc.; and the Carpenter has been constructing fowl-houses and fences. Both tradesmen report progress on the work done by the students under their tuition during the month.

I have to report favourably on the progress made by students engaged on field work during the month.

Eight farmers' associations, comprising a total number of 200 members, have visited the Farm during the month.

On the 26th the Field Experimenter, Mr. Hosking, left to take over the duties of Curator at the Weenen Experiment Station.

ALEXANDER REID,
Farm Manager.

HOUSE MASTER'S REPORT FOR MONTH OF MARCH, 1907.

To Director Experiment Stations.—

The past month has continued to show a steady increase in the number of students at Cedara, the number in residence being now 27, with one more entered to come during the middle of this month. This practically reaches the limit of our accommodation, though means have been devised whereby we shall not have to refuse students should any more apply for admission. The number of visitors to the farm for last month also approaches a record: between 230 and 250 visitors having been entertained at the school. This has of necessity thrown an immense amount of extra work upon the Matron, and great credit is due to her for the excellent manner in which these large lunch and breakfast parties have been catered for. The school having now been in existence for a year, and several students having now completed the short, one year's, course, I think it would be an excellent plan if you could in some way let the farmers of the Colony know that we shall from time to time be turning out young men from this school who will be seeking for situations on farms. Of course many students on leaving this school will go straight on to their fathers' farms or start on their own account; but there will be others who, for various reasons, will prefer to seek situations either as assistants or managers. I would propose that some careful system of testimonials be adopted whereby we should tell any farmer, who thought of giving employment to any of our students, exactly the capacity of such student in each branch. Thus, after a time, we might find that farmers would be glad to take young men on as assistants who had been trained here, as they would know what they might be able to expect them to know in each branch. In fact, I would suggest that a sort of Labour Bureau might be started here, by which any student who wanted a situation after leaving here might register his name with you, together with the date at which he intended to leave; and by which any farmer who required any white assistant might write to you stating all particulars of what he required. I think if some system of this sort could be started, it would prove of benefit both to many of the students here and to farmers in want of assistants.

C. W. HANNAH, M.A.,
House Master.

WINKEL SPRUIT.

To Director Experiment Stations.—

With the exception of coffee stumps which were planted early in the month, no other sections have been planted.

The work has consisted chiefly of replanting chicory section, filling in blanks on aloe section, and transplanting celery, ramie, and tea plants from seed beds. All the weeding is well in hand, and we are now busy erecting a large crib for the storage of maize cobs.

The monkeys are causing us a lot of trouble, their depredations amongst the maize crops necessitating the constant time of two Indians, one to each of the large sections, who are on the watch from daylight to dark, Sundays included. We have shot a number of them, but there are still hundreds prowling about the bush.

Mostly all the crops are looking well, in fact the only exception being the Lima Beans, which are covered by rust. The flying weavil is very conspicuous this season, and is doing a great deal of damage to the ends of the maize cobs, especially those which are inclined to open at the top. In selecting seed for next season's planting, it will be advisable to carefully select from the cobs that are well covered by the husk, as the weavil and other pests do not trouble them so much as those that are open.

The peanut foliage is covered by black spots, but this does not appear to effect the nut, as the crop now growing is the best ever grown on this Farm.

The cowpeas are making fair headway, but unfortunately there are a number of blanks in the rows owing to some of the seed not germinating and my not having any seed left to replant with.

Land has been prepared for planting potatoes, and we are now awaiting seed, which should be here in the course of a few days. Experiments carried on for the past two years in Times of Planting Potatoes (viz., every 15 days), tend to prove that March and August are the two best months in which to plant on the Coast. This does not mean that we get a heavier yield, but we get a far superior eating potato. September, October and November plantings have given heavier yields than any of the other months, but the tuber is usually covered by watery nodules causing early decomposition and leaving a dark spot on the potato when cooked. Careful investigations prove that these nodules are caused by excessive moisture in the soil, more especially on loose sandy soil, where the sun has a powerful effect, forcing the young tubers to absorb more moisture than it requires, creating diffusion and to a great extent weakening the starch contents. If late March or early April plantings are fortunate enough to get a steady rain, or enough to help the young shoots through the soil, we can be certain of reaping a fair crop of splendid eating potatoes.

The eleven Inanda varieties of cane which were shown by illustration in last month's *Agricultural Journal* (although planted late in the season) are making good growth, and should produce sufficient cuttings to plant about four acres this coming season.

Horsesickness has been very prevalent on the Coast this year, and we were unfortunate in losing a reliable animal only purchased a month before.

W. JOHANSEN, Manager.

Agricultural Organisation in Natal.

MEALIE EXPORT.

The spirit of progress in co-operation is exemplified by the project brought forward by the Richmond Road Association, and carried as a resolution at the recent Conference of the Natal Agricultural Union, for the formation of a central mealie growers' union.

This step may be taken as some indication that the efforts of the Government to build up an oversea trade in the products of the Colony are meeting with some response in the shape of the co-operation of the farming community. Soon after the present Ministry took office, it was brought to their notice that there would be a surplus of some 500,000 muids of mealies over and above the requirements of the Colony this season; and Ministers decided to consider the question of turning this surplus into actual cash. It was felt that the freights and railway rates were high, and that the first thing to do was to see what the steamship companies were prepared to do to help the mealie-grower in regard to rates. At the Natal Agricultural Union Mr. Hitchins stated that rates had been secured from Durban to London at 15s. per ton. There would be a small charge made in London for the sale of mealies, commissions, and other expenses, which would amount to sevenpence a muid. A rebate of 3d. would be allowed on each new sack, reducing these charges to 4d. a muid. He also stated that the Government, in consultation with the General Manager of Railways, had decided to reduce the railage on mealies to a half-penny per ton per mile, with a minimum of 5s. Mr. Hitchins also referred to the question of the shipment of mealies at the Point. The Government would place a man there for the protection of growers. His duty it would be to test every consignment of mealies. Mealies must be clean and properly dried. The bags must be new and well sewn, and he knew that from his 30 years' experience at the Port. If the Government reduced the railage to the almost unpaying rate that they had decided on doing, the Government would ask the farmers to send nothing but the best article for shipment to England; and the Government would see that the principle was carried out. For instance, if 500 bags, marked "B," were sent to the Point, and the first bag examined did not come up to the mark, the sender would be advised that they were there at his own risk and expense. It had been bruited about, Mr. Hitchins went on to say, that the Government were buying up mealies for shipment. This was not the case. The Government were endeavouring to assist the mealie-growers to export this valuable product; and they wanted to see mealies shipped from Natal in quantities similar to those shipped from South America. The freight was lower than for South American mealies at the present moment, and it had been brought as low as or even lower than that of any Colony he knew of. A Durban gentleman was prepared to give seven shillings a muid at the Point for mealies if they were able to pass the Government agent. The price of mealies in London was a little over ten shillings a muid. He hoped that mealies from the middle part of the country would not run the farmer into an expense of over 2s. 3d. a muid. He had endeavoured to obtain the fullest particulars as regards the mealie market in London; and his advices showed that the Natal mealie would fetch 3s. 6d. a quarter more than the South American mealie, which was the prevailing product consumed in London. He hoped the farmers would assist the Government as regards the details required for this shipment. Then, he believed, it would be a very valuable asset, and not, as it had always been considered by some people, "the miserable mealie."

Mr. Deane (Minister of Agriculture), who also spoke, said that the shipment of mealies would be under the administration of the Department of Agriculture. During the months of June and July, the intention was to collect samples of white and yellow mealies throughout the Colony. Out of that mixture they would draw three samples, which would be forwarded to London, Liverpool and Hamburg. Buyers, of course, would rely on stocks being up to the samples. The advantage of selling on sample was that before the mealies left the Point the consignor knew what they were going to realise. The Government intended giving every facility for storing these mealies at the railway sheds and at the Point. In the past it had been the custom to keep on importing things into the Colony, but they now realised that this was not conducive to the Colony going ahead. The Government now resolved to change things about and export products from the country. The fruit industry was being assisted in like manner. They wished to see every industry which depended on the soil develop; and they recognised that if they would develop the country it must be on the lines they were now going upon. In regard to amounts realised on the sale of mealies in London, Mr. Hitchins stated that such monies would be banked by the Agent-General and cabled to any bank in this country without any exchange anywhere. He took the opportunity of thanking the Natal Bank for the great facilities they had afforded the Government and farmers in this matter.

The Government has thus done good work in preparing the way for combined effort on the part of the farmers themselves, and, as has been evinced by the resolution passed at the Conference, the farmers have not been slow in taking advantage of the opportunity. In bringing forward the motion of the Richmond Road Association, Mr. Alexander explained that the proposed mealie-growers' union would be on co-operative lines; and that the idea of his Association was to establish a nucleus from which to develop.

Such an organisation as the proposed union, carried out on co-operative lines, will have a twofold effect upon the cultivation of mealies in this country. It will first of all prove an incentive to the farmer to put as much land as he possibly can under mealies, and secondly, act as a spur to induce him to expend as much thought and energy as possible on the production of high-grade corn. Not only will each supplier of mealies receive a fair price (allowing for grade) for his surplus grain, but he should also participate in the profits of the Association, be they great or small.

The New Maritzburg Abattoir.

FACILITIES FOR THE SLAUGHTER OF CATTLE.

Eleven years ago the great rinderpest plague swept over the face of Natal. Thousands of cattle succumbed to the disease, and the losses sustained by the farmers in cattle were enormous. East Coast Fever now threatens to sweep through those portions of the Colony already infected; and in order to enable the farmers in the infected areas, and those adjoining, to dispose of their cattle to advantage, the Government has erected an abattoir in Maritzburg.

In a short space of time, busy workers have erected, alongside the present Government Cold Stores, an up-to-date abattoir for the slaughter of cattle sent in by farmers and others. The yards and buildings are enclosed by high galvanised iron fences, with strong gates. Iron fences also divide the enclosed area into three large paddocks, two of which are to be utilised for farmers' cattle and the other for butchers' stock. There are three entrances from the railway line (which runs within a few yards of the abattoir). Two platforms constructed alongside the line enable the cattle to be driven direct from the trucks on to the platform, whence they are conducted, by means of railed passages, down an incline to the general floor outside the abattoir. Once the cattle are in the abattoir enclosures, there is no possibility of their ever getting out again alive.

The abattoir itself is a clean, well-ventilated, concrete-floored structure, about 81 feet by 70 feet. The cement floor is traversed by shallow drains, which, with the means available for flushing the floor, enable the work of slaughtering to be carried out with every regard to cleanliness. Two cisterns collect the blood and offal, which is to be sent from time to time to the Central Experiment Farm for use as manure. There are at present ten killing pens, and there is room for more if required. After slaughter, the meat is hung at the far end of the abattoir, and from there it can either be taken direct to the railway trucks or may be passed to the cold storage. Two doors lead from the abattoir into the cold stores, a wall of the latter building forming one side of the abattoir.

The whole concern is characterised by the up-to-date methods employed, and by the regard that is being given to cleanliness and despatch. In the opinion of Mr. A. R. Burford, the Manager of the Cold Stores, there is probably no abattoir like this one in Africa. Arrangements are also being made for the watering and feeding of the cattle whilst they are in the kraals.

Mr. Burford, who was lately manager for Messrs. Crart & Co., of Maritzburg, has the whole direct management of the abattoir in his hands. His long experience in these matters will ensure the greatest possible efficiency in working arrangements, etc.

Everything is now in working order, and anyone desirous of sending forward cattle, sheep or pigs for slaughter can now do so. The provisional abattoir charges will be found among the Departmental notices at the end of this issue. These charges, it may be stated, will be subject to alteration later on, when sufficient time has elapsed to judge of their adequacy. Special rates will be quoted where quantities of cattle have to be dealt with and where meat only requires to be chilled.

Both the abattoir and the Cold Stores are now under the management of the Department of Agriculture. Revised charges for the Cold Stores are now being printed; and every information regarding the storage of fruit, vegetables and agricultural produce generally will be furnished on application being made to the Manager.

East Coast Fever.

TEST OF MR. TURTON'S ALLEGED CURE.

THE COMMITTEE'S REPORT.

THIS experiment was carried out for the following reasons:—(1) To show the public that East Coast Fever is transmitted through the agency of ticks, viz., the brown and red ticks. The names of the committee appointed to watch the experiment on behalf of the public are Messrs. F. Turton, William Craig, and E. C. Saville. (2) To test a cure said to be held by Mr. A. A. Turton for East Coast Fever. (3) To test a preventative said to be held by Mr. A. A. Turton. (4) To show that animals can only acquire the disease by being bitten by infected ticks. (5) To show that a salted animal does not contract the disease again, although bitten by infected ticks.

To put these tests to a trial, seven animals were selected and placed in a stable belonging to the Dundee Corporation (by kind permission of the Mayor). The committee, together with the Assistant P.V. Surgeon, Mr. A. A. Turton, and D.V.S. Bruce, agreed to carry out the test on the following conditions:—Four animals not known to have had East Coast Fever, to have ticks placed on them; two animals not known to have had East Coast Fever, to remain free from ticks, to be tied up alongside those with ticks placed on them; one animal known to have recovered from East Coast Fever, to have infected ticks placed on it. The animals were placed in the stable in the following order:—Nos. 1, 2, 3, and 4 to have ticks placed on them, Nos. 5 and 6 to remain without ticks, No. 7 (salted animal) to have ticks placed on it.

On the 16th March these cattle were placed in the order above described, and it was agreed that Mr. Turton should treat No. 3 with his preventative before ticks were placed on it; No. 1 to be treated with his preventative on the 3rd day after ticks were placed on it; Nos. 2 and 4 to be treated by Mr. Turton so soon as their temperatures reached 102·5; Nos. 5, 6 and 7 not to be treated. The selection of the four animals to be treated in the manner described was left entirely to Mr. A. A. Turton. A European officer with two native guards was placed in charge of the whole number, and it was agreed that neither Mr. Turton nor the D.V.S. should visit the enclosure unless accompanied by one member of the committee or conjointly.

With reference to the control animals (Nos. 5 and 6), it was pointed out that these animals had come from an erf where one animal had died from East Coast Fever, and where the aforementioned salted animal was brought from. It was also pointed out that it was possible and probable that these animals might be already infected, although not showing visible signs of disease (*i.e.*, in incubation period, which is known to be an average of 14 days). Mr. Turton personally stated in the stable in the presence of the committee, D.V.S. Power and D.V.S. Bruce, that he was not satisfied that these animals were clean, but, on account of the difficulties which had arisen in securing the cattle, it was the anxious desire of the committee to proceed with the experiment, and it was accordingly decided to go on with the test.

The ticks were placed on the animals in the order named, *i.e.*, Nos. 1, 2, 3, 4, and 7, by D.V. Surgeons Power and Bruce in the presence of the committee and Mr. Turton, at 3 p.m. on the 16th March, an average of about six nymphae ticks being placed on each animal.

No. 1.—This animal was subjected to treatment by Mr. Turton on the 18th March, the 3rd day after the ticks being placed on it. His temperature remained normal until the 12th day after being infected, on which day his temperature rose to 103·2. On the 21st day his temperature had dropped to 102·3, and he looked decidedly better, although not chewing his cud; on the following day his temperature again started to rise, and on the 24th day was 105. This animal died on 10th April, 26 days after being infected with ticks.

No. 2. (Black and white ox).—This animal was not to be treated until his temperature started to rise, *i.e.*, to 102·5. On the 12th day his temperature rose to 105·2, keeping high, an average of 105 until the 19th day. On the 20th day it dropped, and he died the same night. After the 3rd day of rise in temperature (*i.e.*, 15 days after ticks were placed on the animal) he was visibly sick, showing staring coat, drooping ears, slight enlargement of the glands in the vicinity of the throat, loss of condition, but feeding moderately well, and discharges normal. The animal gradually got worse on the afternoon of the 20th day after ticks were placed on him. He was seen to be in a dying condition, showing dribbling from the mouth, slight running from the eyes, very drooping ears, coughing and not ruminating. It was observed that he was coughing for some days. His droppings at no time during his illness showed any marked change from a healthy state.

No. 3. (Black bull 18 months old).—This animal was treated by Mr. Turton immediately before ticks were placed on it. On the 13th day this animal's temperature rose to 104, reaching 105·4 on the 17th day; on the 18th day his temperature began to drop, and he died the following morning (19th day). On the second day after ticks were placed on it, this animal appeared to be suffering from the effects of Mr. Turton's inoculation, but recovered from this. On the 14th day he was visibly sick, showing symptoms similar to No. 2, although there was no marked coughing.

No. 4. (Yellow bull 2 years old).—This animal's temperature remained normal until the 12th day, when it reached 102·3. Mr. Turton desiring to treat at this stage he was allowed to do so. The following morning his temperature rose (13th day) to 104, varying from 103 to 107, the animal dying on the night of the 23rd day. *Post-mortem* was made the following moring at 9 a.m., but putrification had set in, consequently a satisfactory *post-mortem* could not be made. However, it was observed that this animal's spleen was not enlarged and water in his bladder was normal.

No. 5.—This animal was tied up next to No. 4, with a small partition between them, and was placed there for the purpose of being a control animal, having no ticks placed on it. As before mentioned, this animal came from an erf where a beast had died of East Coast Fever, and at the time of placing it in the stable it was pointed out that the animal might possibly be infected. On the evening of the 14th day his temperature rose to 105, and the following morning his temperature was 104·3, from which date his temperature had not fallen below 103·2. On the 24th day his temperature was 105, and for several days previously the animal had been very ill, showing outward symptoms of East Coast Fever, *i.e.*, running at the eyes, dribbling at the mouth, excessive discharge of mucous from the nose, ears drooping, cessation of rumination, dung tinged with blood, enlargement of glands in vicinity of throat and flank, very great loss of condition, eating very sparingly, and in very depressed condition, and coughing. This animal died on the evening of the 8th instant.

No. 6. (Red yearling bull).—This animal was tied up next to No. 5, being the second control animal having no ticks placed on it. On looking at this animal's temperature chart it will be observed that he behaved in a most peculiar manner. On the 24th day his temperature reached 105·5, and was visibly sick, showing all the symptoms of No. 5. Death took place on Wednesday evening, 10th April.

No. 7. (Black and white heifer, salted).—This animal was tied up next to No. 6, and had ticks placed on it to prove whether a salted animal would again contract the disease when bitten by infected ticks. This heifer was not in very good condition when placed in the stable, but when handed back to the owner after the test was in a healthy condition, having improved wonderfully.

The conclusions arrived at by the committee are as follows:—1. That the brown and red nymphae ticks placed on the cattle Nos. 1, 2, 3, and 4, transmitted East Coast Fever and established beyond doubt that these ticks are the agents in conveying this disease. 2. That Mr. A. A. Turton does not possess a cure, and that his treatment had no beneficial effect. 3. That Mr. A. A. Turton's preventative failed to protect these animals against infection. 4. The committee is satisfied that the disease can be transmitted by the tick and is not conveyed from animal to animal. 5. That once an animal has had tick fever and recovered it is protected against East Coast Fever, for a time at least.

(Signed) F. TURTON.
WILLIAM CRAIG.
Dundee, 23rd April, 1907. E. C. SAVILLE.

[Temperature charts, and *post-mortem* notes made by D.V.S. Bruce in the presence of the committee and Mr. A. A. Turton, were furnished by the committee.—Ed., *Agr. Jour.*]

East Coast Fever Regulations.

CLAIM FOR DAMAGES.

A case of interest to stock-owners has recently been brought before the Chief Magistrate, Durban (Mr. P. Binns), in which the plaintiff, an Indian, named Gengan, sued Mr. Amos, District Veterinary Surgeon, for £90 damages, the value of nine oxen which had been shot by order of the defendant.

It may be explained that plaintiff's cattle had been moved in an infected area. On this being reported to defendant, he ordered them to be shot, having power to do so under the East Coast Fever Act. Plaintiff claimed that, under the circumstances, he had no right to order their destruction.

Mr. Woollatt (Principal Veterinary Surgeon), in the course of his evidence for the defence, gave illustrations of the manner in which the disease was spread, and said that cattle were shot by orders of officers of his Department when they were moved about in an infected area. He stated that it was the practice of the Department to shoot all animals moved in defiance of the regulations: the Department did not move the cattle back and then prosecute the owner. It was the practice in the Department to accept the statements of local officers, and not hold enquiries before destroying the animals. Drastic measures had to be taken if the spread of the disease was to be arrested.

The Magistrate, in giving judgment, said that the case was one of great hardship for the plaintiff, and the evidence showed that he did all that could be reasonably expected of him, as he reported the movement of the cattle to the police the moment that he found that those whom he had placed in charge of the cattle had disobeyed his orders, and moved them from one place to another, and he regretted that the efforts of the plaintiff did not receive from the police that degree of support that they were entitled to. What, however, he had to decide was whether there was a breach of the law which justified the District Veterinary Surgeon (Mr. Amos), who was now sued in his personal capacity, in taking the action he did in ordering the shooting of the cattle. The evidence showed that Stock Inspector Oswald went to plaintiff's house on February 14th, where he met the plaintiff, who appeared to be aware of his position as an owner of cattle, under the East Coast Fever Act. On that occasion Oswald instructed the plaintiff that he should bring the cattle from where they were at that moment grazing and should quarantine them on his premises. It was also clearly established that Oswald handed the plaintiff a written notice stating that the cattle were in quarantine and that they were not to be taken away. There was no doubt that plaintiff understood the purport of the notice, for the first thing he did was to send for the cattle and bring them on to his own premises. The next day he left for Durban, leaving the cattle in charge of his father, and while he was away these cattle were moved in defiance of his orders. In determining the rightness of the order given by Oswald, he had to take into consideration the place to which the cattle were driven back. The cattle were, as a matter of fact, driven from the residence of the plaintiff along a road which ran from the main Durban-Maritzburg Road to Bellair, and was much used by the people going through the Cato Manor Estate. They were also driven towards a district where there was an outbreak of the disease. There was no doubt that there had been a breach of the quarantine order, a breach of Section 5 of the Act, because the cattle were moved within an infected area. As had, however, been pointed out by Mr. Calder, in order to make the defendant liable, it must be shown that he exercised his powers under the Act recklessly, wantonly, and without reasonable cause. The burden of proof was on the plaintiff. Mr. Amos had under him the Stock Inspector, whom he was entitled to regard as a man to be trusted, and he received in the ordinary course an intimation from that man that there had been a certain movement in defiance of that law, and on that communication he gave the order that they should be shot. He was quite prepared to admit it was a great pity that the animals had been shot. If Mr. Amos had been on the spot, had been able to see the depositions, and been able to go into the local conditions, and make keen inquiry, no doubt his decision would have been different, but he had not exceeded the powers given him under the Act. There was a movement of cattle in contravention of Section 5, and he was entitled to give the order he gave. He exercised ordinary discretion in acting on the report of his subordinate officer, and in doing so he was not acting wantonly. He could not find him personally responsible. He would say, in conclusion, that Mr. Michel had argued the case exceedingly well, and he did not think he had omitted a point that could be urged. Plaintiff had his sympathy, but he was bound to find as he had. There would be judgment for defendant with costs.

Tenders for Mealie Meal.

TENDERS are called for in the *Government Gazette* (9th April) for the supply of mealie meal rations for the Natal Government Railways.

Quotations, in duplicate, addressed to the Chairman of the Tender Board, Auditor-General's Office, Maritzburg, for the supply of good, sound Colonial Mealie Meal, for the three months ending 3rd August, 1907, at Durban, Maritzburg, Estcourt, Ladysmith, Newcastle, Charlestown, Harrismith, and Bethlehem, will be received up till noon on Monday, 22nd April.

Quotation forms and all particulars may be obtained on application at the Stores Superintendent's Office, Durban.

Correspondence.

FARM TELEPHONES.

To the Editor of the "Agricultural Journal."

Sir,—I was much interested in the reference to telephones in "Ergates'" interview with Mr. N. C. T. Harper which appeared in the March number of the *Journal*, and I think it may be, in fact should be, of interest to all farmers to know how cheaply this form of communication can be installed.

There is no reason why every farmer should not be connected by telephone to the nearest telegraph office or railway station, but before this can be done it will be necessary to amend the law with regard to "Private Telegraphs" (telephones). A law would have to be passed which would give all landholders the right to construct, maintain, and use a private wire from his own property to the nearest public office or railway station, on the same lines as the law which now gives him the right to a road to the nearest main road, provision being made for the safety of the public at all road crossings and the Government making a charge for accommodation of instrument and attendance of clerk.

As telephones became more universally adopted, exchanges could be established at country stores, hotels, and other convenient points, which would enable farmers, district surgeons, etc., to communicate direct with one another as well as with the public offices.

The Government now erect private telephone lines at a cost of about £70 per mile; and I saw a notice in the paper a few weeks ago of a new regulation which fixes the charge made by the Postmaster-General for a private wire affixed to the existing poles of a Government line, at £4 per annum per mile, in addition to attendance charges.

An up-to-date farmer in the Ladysmith district told me some time ago that his telephone connection cost him £50 a year, and another farmer who wishes the Government to extend his telephone a further distance of something under five miles is asked to pay £27 a year.

Such charges are, of course, absolutely prohibitive to the ordinary farmer or resident in the country, and form an effectual block to any extended use of the telephone in this direction.

Steel poles, bronze wire, and the very elaborate and permanent fixings used on Government lines, although no doubt representing the best economy in their proper place, are quite unnecessary on private telephone lines. The cost of a wattle pole erected in place, even if renewed every two years, is far less than the interest charges on a steel pole.

Over two years ago I erected a telephone line about eight miles in length at the following cost:—

	£	s.	d.
11 coils No. 12 galvanised plain fence wire @ 13s. 6d. ..	7	8	6
2 small coils binding wire @ 1s. 6d.	0	3	0
100 insulators @ 1s. 6d.	7	10	0
95 wattle poles, 14 to 20 feet long, say	1	0	0
Transport of wire and poles, say	1	0	0
Labour, three natives 10 days each @ 1s.	1	10	0
Superintendence, say	5	0	0
	£23	11	6

Say £24, or £3 per mile without instruments.

I have lately extended the line another five miles, and used insulators which I obtained from Messrs. S. Butcher & Co., Durban, at 3d. each. Had I used these at first instead of those at one shilling and sixpence each the cost would have worked out to a little over £2 per mile.

With regard to the insulation of the wire, I was at first very particular on this point, but as part of the line passed through a bush where trees were being felled it was frequently down on the ground for distances of several hundred feet, and I found that even in wet weather communication was uninterrupted. In the extension above referred to, although there are over fifty points of support (trees and poles, only thirty insulators were used (the number that happened to be on hand), the wire being simply bound to a bolt near the top of the pole at the remaining points. The joints in the wire are knotted in the same way as a fence wire would be, and the earth return is obtained by wrapping four or five yards of wire in a bundle and burying it a foot deep in the ground.

I mention these details in order to show that no skilled labour or special knowledge is required to erect telephone lines, and, although I know that they are contrary to the teachings of text books and telegraph engineers' hand-books, they can be seen and examined by anyone sufficiently interested to come to Richmond to do so, and I shall be pleased to supply further details if required.

The instruments were bought some years ago from Messrs. Henwood, Son, Soutter & Co., and cost £4 10s. each, but if they can be obtained from the Durban Corporation at five shillings each, now is indeed the time, as "Ergates" points out, for farmers to instal private telephones.—Yours, etc.,
HERBERT G. DEMPSTER, A.M.I.C.E.
Richmond, Natal.

CANNING MEALIES.

To the Editor of the "Agricultural Journal."

Sir,—I should feel greatly obliged if any of your subscribers could tell me the way to can young mealies.—Yours, etc.,
F. HARCOURT.
Hill Top, Richmond.

WHEN DID LUNGSICKNESS COME?

To the Editor of the "Agricultural Journal."

Sir,—In reply to Mr. Gibson, When did Lungsickness come? As a boy I remember my father saying that Lungsickness came into Natal from a bull imported by Mr. Baker. This was, I think, in 1857. Where this bull was imported from I cannot say. Mr. Baker was a stock-farmer who lived between Greytown and Muden, Umvoti County. A Mr. F. Stieger, who now lives in Greytown, will, I should say, no doubt be able to give the right information.—Yours, etc.,

M. LANDSBERG.

Krantzkop.

FIBRE IN LONDON.

The following letter has been received by Mr. E. R. Sawer, Director of Experiment Stations:—

Dear Sir,—We have read your interesting report on Sansevieria fibre in the *Natal Witness* of 9th February.

We take the liberty of writing you that, should any planters or companies require the services of a London House to realise their shipments, we shall be pleased if you would keep our name before you.

We have had large experience in handling fibre, and any shipper can depend on our best attention to any business put before us. Any party wishing to know of our standing can make enquiries of any of the South African banks, to whom we are well known.

Thanking you in anticipation,—We are, etc.,

MACKINLAY & CO.

2, Coleman Street, London,
8th March, 1907.

District Reports.

IMPENDHLE, April 13th.—The rainfall since my last report has continued to be generous: 9·84 inches were registered during February, and 6·63 during March. The total to date since the beginning of September amounts to 40·07 inches. Crops as a conseqeunce are looking well throughout the Division, though perhaps a little backward in some parts. The harvest should therefore be a record one, assuming, of course, that the coming of the frost will be delayed a little longer than usual, as it is to be hoped it will, otherwise only an average crop may be expected. Farmers are in anything but a happy frame of mind just at present. Horsesickness has swept through the Division with disastrous results. A large number of animals, some of which were valuable, have been carried off. Few owners have, I understand, escaped. Mosquitoes have been unusually plentiful this season, but it is curious how old standing theories are adhered to. Sceptics should, however, take note of the fact, and I should advise all those interested to make a point of reading the article on Horsesickness, by Dr Watkins-Pitchford, reproduced in the last issue of the *Agricultural Journal.* They will find in it much matter for digestion. Stock generally looks well, and the Division continues free from the various kinds of stock diseases. Haymaking by some of the farmers has been commenced, but operations in this respect are much retarded by the continuous rains. A great deal of Japanese millet has been cultivated this year, and is now ready to be reaped, but if fine weather does not come soon the probabilities are that the crop will be spoilt. There is less likelihood of this occurring as regards the hay. The grass has been slow in seeding this year, presumably on account of the rains; and as its condition is therefore still quite good it is likely to keep so until the fine weather sets in, as it should do, during the course of this month. Persons taking an interest in angling matters will be glad to hear that during the month of March a number of trout, varying in size from a quarter to three-quarters of a pound in weight, were caught in the Umgeni River, and safely transferred to the stream near Impendhle Village. For the information of anyone desiring to stock their streams, they might find help by copying the procedure adopted as regards these trout, which was as follows:—For the purpose of transferring the fish two large beer barrels were used, and in addition to these two cages made of half inch mesh wire netting. These cages were used for the purpose of holding the fish whilst they were being collected, and were sunk in the stream, so that the fish for the time being were in their natural element, and they remained there until the time for departure came. As soon therefore as the wagon was inspanned, and the barrels filled with water, the fish were transferred to them from the cages. The wagon was then set going, and at each stream passed the water in the barrels was replenished. The result was that the fish arrived at their destination in as fresh a condition as when they were taken out of the Umgeni, and the lower reaches of the Furth stream, on the farm of Mr. Morphew. Fish were plentiful in both the streams referred to, and a far greater number might have been caught had the manipulators of three of the rods only knew how to work.

T. B. CARBUTT, Magistrate.

MTUNZINI, 30th March.—The weather, on the whole, for this time of the year has not been bad, and I am glad to say that the mouth of the Umlalazi River still continues to keep open, consequently the mosquitoes are less troublesome and very scarce. The locusts have done a great deal of damage down the southern portion of this Division. During the month of February our total rainfall was 3·17 inches; during the present month only 1·7 inch fell, consequently we are badly in need of rain. So far the Division still remains free from cattle diseases. One horse died during the early part of the month, the property of Mr. E. A. Purser, Forester at Ngoye, the cause of death being Blue-tongue. I am informed that Mr. Wylie, Curator to the Durban Botanical Gardens, and several other gentlemen have been spending a few days in the Ngoye Forest, collecting some rare specimens of palms and other plants, which have been taken to Durban Gardens.

R. G. ROBERTS, Acting Magistrate.

WEENEN.—Snakes appear to have been plentiful this season, and over two dozen heads have been forwarded by me to the Government Bacteriologist since the beginning of the year. A recovery from the bite of a black mamba is reported from the Tugela, but enquiries I have made by no means establish the identity of the snake. An Indian in the employ of the channel keeper was bitten by, presumably, a cobra, and has been successfully treated by the District Surgeon. Through the courtesy of Mr. Macpherson, the manager of the Experimental Farm in Weenen, I was permitted to see the factory for the cure of tobacco which has just been erected by Government, and which it is to be hoped will be largely taken advantage of by local growers. It is unquestionable that good tobacco can be grown here; and if only uniformity in the manufacture can be secured, as should now be the case, there is no reason why Weenen should not command the respect of the South African markets. A number of healthy looking varieties, almost ready for plucking, may be seen on the Government block. Experiments in lucerne are instructive, and leave no doubt as to the value of cultivation. The system of drainage, open and tile, now under attention should have its lessons for the surrounding blockholders. It is a matter for surprise and disappointment that so little interest is taken locally in the Experimental Farm as an educational concern. The majority of the holders of the irrigable allotments appear indifferent to the object lessons which may be learned there at Government expense. The opening of the new line, surely one of the greatest events in Weenen's history, should be an accomplished fact before the end of April. The official opening will probably be on the 17th.

C. G. JACKSON, Magistrate.

A simple rough and ready device for smoking bacon is sent by a correspondent to the New South Wales Department of Agriculture. The outfit consists of a large hollow log, a case, or a cask. If a log is used, cut off a piece about 4 feet in length, stand it on end, and drive a few nails round the top, inside, to hang the hams and shoulders on; then drive two forked sticks into the ground inside the log, one on each side; put a stick across, resting on the forked sticks, and upon this place two hooks—one at each end—upon which to hang two sides of bacon. With an inch auger bore a hole near the bottom, and when the pork is hung inside cover the top with two or three thicknesses of bagging. If the log is stood out of doors, a sheet of iron will be required for shelter in case of rain. Having everything in readiness, get a cold-blast smoker (obtainable at any leading ironmonger's), charge it with dozy—*i.e.*, slow-burning smoky wood—and force the smoke through the auger hole in the log for about five minutes at a time three or four times during the day. A plug should be placed in the hole after each smoking. At the expiration of three or four days the bacon will be nicely browned and ready to take out.

Gardening Notes for May.

By W. J. Bell, Nurseryman, Florist and Seedsman, Maritzburg.

Where water is available small sowings may be made of Cabbage, Beet, Kale, Carrot, Lettuce, Mustard and Cress, Parsnip, Radish, Turnip, Spinach, and the various kinds of herbs, such as Parsley, Sage, Thyme, Marjoram, Savory, etc.

Earth up Cabbage and Cauliflower plants as required; keep the surface well stirred up between the rows of all growing crops, and commence to water freely as soon as dry weather sets in. Plants that are well advanced should have occasional applications of liquid manure, and especially the Cauliflower, if fine heads are required.

Peas also will be greatly benefited by weekly doses of liquid manure as soon as the pods have set.

Thin out root crops, such as Carrot, Turnip, Beet, Radish, etc., giving each plant sufficient space for full development. All root crops should be sown in rows, as then both thinning out and weeding are more easily done, and the hoe can be used with much more effect.

Celery should be earthed up as it becomes ready for the process, taking care to keep the soil out of the heart of the plant and promote unchecked growth by frequent supplies of liquid manure.

Cos Lettuce will be much improved by tying up for blanching. Strips of Raffia should be used for this purpose, as they are soft and will not cut through the leaves. Soak in water a few minutes before using.

Dig over any vacant pieces of ground that are to lie fallow during the winter, leaving them as rough as possible in ridges.

FLOWER GARDEN.

Sow in boxes in a well-sheltered position *Bellis perennis* (double Daisy), Carnation, Cowslip, Delphinium, Forget-me-not, Hollyhock, Pansy, Pentstemon, Polyanthus, and Primrose. The boxes must have plenty of drainage and be filled with nice sandy soil to within two inches of the top, and care should be taken that they are placed perfectly level and raised on bricks or stones.

Very careful treatment is required in the matter of watering fine seeds sown in this way, as failures are generally caused by want of attention in this respect.

Where the frost is not too severe in winter, all varieties of hardy annuals may still be sown in the open for spring and early summer flowering.

Towards the end of the month Dahlias and Chrysanthemums may be cut down. Dahlia tubers may be either left in the ground and covered over with a little litter or be taken up and stored away till spring in dry sand or soil. Where moles are troublesome it is not advisable to leave them in the ground.

After cutting down the old stems of Chrysanthemums, the ground should be forked over all round the roots and the whole covered with a mulch of old decayed manure or litter for the winter.

In the spring they will send up a lot of young shoots, from which cuttings may be taken; after which the old stools should be lifted, divided and replanted in fresh soil. In any case they should never be left in the same ground a second season, as is frequently the case, throwing up a mass of weakly stems and producing miserable blooms when the flowering season comes round. From divided roots some varieties will attempt to bloom during the summer, but these should be cut down close to the ground in December; in fact, most of these plants will require to be cut down about that time. They will then throw up fresh flowering stems for flowering at the proper season in the autumn.

The plants grown from cuttings will not require this treatment, as they do not get the same start, but flower naturally at the right time.

SOWING OF TREE SEEDS.

This is the best time to sow most of the tree seeds, such as Pines, Cypress, Cedar, Juniper, Casuarina, Eucalyptus, Blackwood, etc.

Where only small quantities are required sow in shallow boxes. See that they are well drained by having holes in the bottom and a layer of broken brick or cinders, then a layer of rough fibrous loam, and finish off with nice light sandy soil to within two inches of the top. The boxes must be placed perfectly level, raised a little from the ground so as to admit of free drainage. Sow the various sorts of Pines and Cedars about a quarter of an inch apart, and cover with about half an inch of soil. The smaller seeds, such as Cupressus, Casuarina, Callitris, Thuja, Cryptomeria, and Eucalyptus should be sown thinly and covered with about a quarter of an inch of finely-sifted soil. The boxes should be in a sheltered place, but not under trees, and care must be taken not to allow them once to get dry, especially after germination has commenced.

Shade should be afforded immediately the seeds are sown by laying on the boxes a layer of grass or straw, which should be partially removed as soon as the seedlings are well through, and as they become stronger it may be removed altogether.

During 1906 the United Kingdom imported 2,426,644 cwts. of beef.

The total world's consumption of sugar during the year 1905-6 amounted to 13,915,849 tons as compared with 12,541,726 tons in 1904-5 and 13,111,620 tons for 1903-4. The world's production of sugar in 1905-6 was 14,164,894 tons. In 1905-6 it was 11,921,518, and in 1903-4, 12,678,749 tons.

Animal Diseases.

THE POSITION IN MARCH.

East Coast Fever.—The Principal Veterinary Surgeon (Mr. S. B. Woollatt) reports that, during the month of March, there were 18 fresh outbreaks, all within the infected districts, as follows:—Vryheid and Ngotshe 10, Paulpietersburg 2 (one on the farm Rooipoort and one on the Town Lands), Dundee 2 (on the farms Limehill and Oscarberg), Nqutu 2, Hlabisa 1, and Nongoma 1. In the Stanger and Mapumulo districts the disease still continues to extend. The whole of these districts is looked upon as one infected area. The following deaths were reported during the month:—Vryheid 645, Paulpietersburg 4, Dundee and Umsinga 22, Nqutu 90, Hlabisa 46, Nongoma 559, Lower Tugela and Mapumulo 1,000, Mahlabatini 56, Eshowe 8, Muden 8, Durban County 162, and Umvoti 8, making a total of 2,609. In the districts of Dundee and Umsinga, Hlabisa and Mahlabatini, temperature camps are still being used.

During the month, Mr. Woollatt says, in his report to the Minister of Agriculture, many cures for East Coast Fever were offered, and in two cases experiments have been carried out. In Dundee six animals were provided by public subscription and by Mr. Turton. In another portion of this issue will be found the committee's report on the experiment. In the case of the Dundee cattle it is to be regretted, Mr. Woollatt says, that two animals which were used as controls were taken over. These animals were objected to on the ground that they came from infected veld and were probably infected. This was pointed out at the time to the committee and to Mr. Turton, and was distinctly understood. Owing to the difficulties in getting other animals, both the committee and Mr. Turton were anxious that these should be accepted as controls and the test proceeded with; and owing to the risk of the whole thing falling through unless the animals offered were taken over, they were accepted on the understanding that they were probably infected. With regard to the four animals which were tick-infected by the Veterinary Department, there appears no doubt, Mr. Woollatt says, that they were free from infection prior to the ticks being placed upon them, as they had been kept in Mr. Turton's stables for some weeks previously.

In Durban another test was carried out. Mr. J. W. McKenzie, of Richmond, forwarded two young bulls to the Veterinary Compound to be tick-infected with a view to ascertaining whether a certain agent with which he had been treating these animals conferred any immunity or had any curative affects against East Coast Fever. These animals, a yellow bull and a black bull, were infected, in the case of the yellow bull on the 23rd March, with East Coast Fever ticks, and the black bull on the 25th March. Both these animals died of East Coast Fever after the usual period of incubation and illness.

In both these tests blood slides were sent, and in each case were certified by the Government Bacteriologist as showing parasites of East Coast Fever.

The following cases of East Coast Fever, reported by the D.V. Surgeon, Stanger, are of interest as showing how infection can be carried from infected grass:—

In September last Mr. W. van der Wagen, residing in Stanger, was given permission to keep three cows and two calves (yearlings) tied up in his stable yard, on the understanding that they were to be kept tied up and fed, for which he gave his bond. One of the cows was lent to Mr. Van der Wagen by Mr. Jackson, of Stanger, their agreement being that Mr. Jackson should feed his cow on consideration of his obtaining some milk. Mr. Jackson cut grass on his farm near Stanger, adjoining the Stanger Commonage, which had been declared an infected farm, with the result that ticks were carried in the grass to the cow, and she died in December, 1906, of East Coast Fever. Mr. Van der Wagen, on the other hand, instructed his boys to cut grass amongst the sugar cane to the south of Stanger. This they must have done for some time, and, probably finding that there was plenty of grass nearer than the sugar cane, they must have cut on the commonage, with the result that, on the 17th March (six months after being bonded) one yearling died of East Coast Fever. Both Messrs. Jackson and Van der Wagen are quite satisfied as to how their cattle became infected.

Lungsickness.—During the month two fresh outbreaks occurred in the Krantzkop district, in the vicinity of the old outbreaks, and they are from the same source of infection and are really one and the same outbreak in this district. As is usual with cattle which are susceptible to Lungsickness, Mr. Woollatt says, that is cattle which have not been in contact with the disease by inoculating, the mortality is invariably high, notwithstanding that all care may be used in the method of inoculation and in the selection of virus. During the month there were 37 deaths from inoculation in the Krantzkop district. This mortality should demonstrate the absolute necessity of enforcing and maintaining strict quarantine on all cattle infected or in contact with infected animals, as the mortality in other parts practically free from the disease would be high, apart from the other losses incidental to this disease. "We are doing all we can to persuade the owners to destroy all cattle actually infected with the disease, and it is to be regretted that the Lungsickness Act does not provide for their destruction. While we are able to say that any animals are in a diseased condition, as we shall in the case of an old lunger, we intend to maintain a strict quarantine on such animals, and owners will be well advised if they dispose of these animals for slaughter if they are unable to see the policy of destruction when they are satisfied they are affected with the disease."

Horsesickness.—The mortality in this disease almost doubled that of February. The following deaths were reported:—Ladysmith 6, Newcastle 20, Utrecht 16, Inanda and Ndwedwe 14, Weenen County 125, Durban 35, Umvoti 40, Umgeni Division 96, Upper Umkomanzi 5, Lion's River 74, Dundee 21, Impendhle 19, Lower Umzimkulu 10, Alexandra 14, Ixopo 100, Polela 34, Underberg 25, Paulpietersburg 9, Vryheid 45, Babanango 5, Umtungeni and Lower Umfolosi 1, making a total of 714 deaths.

The immunisation of mules is still being continued, and some further deaths have occurred amongst animals which had been issued as immune. Some six salted animals are reported to have died; there is only authentic evidence forthcoming in four cases. In other reports on the subject it has been made clear that with the varying degree of infection a few individual animals will die of Horsesickness after inoculation; and in seasons such as the present, when, as shown by the returns, the mortality has been exceptional, there is no doubt, Mr. Woollatt says, that the results of the inoculation of the mules for Horsesickness have proved it to be a success. It is, of course, understood that the individual who is so unfortunate as to lose an animal does not think so, but, taken in the aggregate, Mr. Woollatt thinks it will be admitted that the results are very satisfactory.

Sheep Scab.—During the month six licenses were raised:—Klip River 2, Umvoti County 3, Lion's River 1. Seventeen flocks were placed under license:—Estcourt 4, Weenen 2, Umvoti 1, New Hanover 1, Krantzkop 1, Lion's River 1, Polela 1, Utrecht 1, Vryheid 5. There are now 55 flocks under license.

Glanders.—Four outbreaks of this disease occurred during the month: Newcastle, Durban, Dundee, Vryheid.

"Stiffsickness" (3 days' sickness).—The P.V.S. reports that this disease is spreading rapidly throughout Natal, and exists at present in the districts of Newcastle, Dundee, Ladysmith, Paulpietersburg, Vryheid, and Nqutu. The mortality, as was the case in the Transvaal and Rhodesia, is insignificant. Eight deaths are reported from the Newcastle district. Owners of cattle cannot well mistake this disease, as it spreads rapidly amongst their herds and is characterised by great stiffness of the animal. The stiffness passes off in three or four days. Many animals become sick at the same time. A dose of purgative medicine, Mr. Woollatt states, produces the best results, but when large numbers are affected, the mortality is so small as to scarcely warrant this expense.

Blue-tongue.—D.V.S. Cordy (Greytown) reports that this disease has caused heavy losses among sheep in this district.

Quarter-evil.—D.V.S. Harber (Maritzburg) says a number of deaths were reported from this disease—chiefly from Lion's River Division. In Dundee Division 12 deaths were reported.

Importation of Stock by Sea.—D.V.S. Amos reports that 2 horses, 836 sheep, and 9 dogs were imported into Natal by sea during March.

Meteorological Returns.

Meteorological Observations taken at Government Stations for Month of March, 1907.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.). Means for Month. Maximum	Means for Month. Minimum	Maximum for Month.	Minimum for Month.	RAINFALL (IN INCHES). Total for Month.	No. of Days.	Heav'st rainfall in 1 day. Fall.	Heav'st rainfall in 1 day. Day.	Total for Year from July 1st, 1906.	Total for same per'd from July 1st, 1905.
Observatory ..	83·7	68·2	89·1	62·1	1·96	14	·52	11th	30·91	31·41
Stanger ..	86·1	65·8	96	60	2·36	17	·76	30th	33·73	31·09
Verulam ..	92·1	67·9	98	61	2·21	9	·61	30th	31·66	25·76
Greytown ..	89·7	46·0	109	39	2·73	14	·70	6th	31·52	23·59
Newcastle .	85·2	58·8	94	51	9·33	14	2·79	1st	54·24	29·16
Ndwedwe ..	77·5	65·8	86	58	2·92	14	·58	11th	34·65	35·19
Estcourt ..	84·1	58·0	90	54	3·80	13	·75	9th	28·21	24·72
Mid-Illovo ..	78·2	61·1	89	54	3·50	15	·91	9th	36·74	26·28
Port Shepstone ..	82·5	63·4	85	60	..	..	..	..	..	..
Umzinto . ..	82·6	56·2	87	54	2·46	9	·84	14th	40·68	33·14
Richmond ..	79·2	59·2	93	51	4·88	19	1·14	14th	43·99	29·85
Maritzburg ..	80·9	58·8	93	52	7·23	19	1·51	28th	46·87	24·32
Howick ..	79·9	56·6	91	51	4·80	15	·71	30th	38·00	22·33
Ladysmith ..	90·6	58·4	96	50	3·77	9	1·64	16th	..	..
Dundee ..	84·6	61·6	89	55	3·38	7	1·30	12th	32·52	27·73
Weenen Gaol ..	91·1	58·5	96	52	1·68	14	·47	30th	27·56	21·80
Impendhle ..	72·9	51·4	81	33	6·63	18	1·24	8th	41·07	..
New Hanover ..	85·3	57·5	94	52	6·93	15	2·02	14th	50·49	25·03
Vryheid ..	83·7	58·4	94	51	2·14	8	·72	17th	33·09	..
Nqutu ..	82·1	59·0	91	54	2·58	11	·42	29th	..	19·71
Nongoma ..	81·9	53·7	90	45	2·56	8	·60	16th	35·54	19·78
N'Kandhla ..	79·8	53·3	89	41	2·73	11	1·17	15th	29·06	23·74
Umlalazi ..	85·4	53·6	88	40	1·07	5	·50	24th	..	28·62
Hlabisa ..	83·4	66·0	90	58	1·01	5	·39	28th	37·92	24·70
Melmoth ..	83·7	61·8	95	56	1·88	10	·43	3rd	33·65	20·88
Ubombo ..	83·0	63·1	91	58	1·03	9	·30	24th	42·72	..
Bulwer ..	..	..	..	..	9·35	22	1·85	27th	..	..
Point ..	..	..	..	..	2·10	12	·67	10th	32·40	32·05
Camperdown ..	79·9	60·0	92	53	2·80	13	·52	28th	33·94	..
Charlestown ..	77·5	52·1	84	44	4·00	10	·95	27th	49·12	..
Ingwavuma ..	76·7	60·9	86	56	2·66	9	1·00	17th	..	..
Mahlabatini ..	83·4	58·7	95	51	1·22	9	·31	2nd	29·39	21·79
Empangeni ..	..	..	..	..	1·14	5	·50	25th	28·01	28·11

Meteorological Observations taken at Private Stations for Month of March, 1907.

STATIONS.	TEMPERATURE (in Fahr. Degrees.) Maximum for Month.	Minimum for Month.	RAINFALL (in inches). Total for Month.	No. of days.	Heaviest Rainfall in one day. Fall.	Heaviest Rainfall in one day. Day.	Total for Year from July 1st, 1906.	Total for same period from July, 1905.
Nottingham Road (C. J. King).. ..	..	..	7·82	22	1·75	27th	45·67	35·01
Adamshurst (Wm. Adams)	90	54	5·51	16	1·27	8th	..	21·72
Hilton College (W. Engel)	88	50	5·29	20	1·14	14th	43·05	24·61
P.M.B., Town Bush Valley	..	..	8·14	19	1·70	28th	51·66	33·07
Mid-Illovo (Ismont)	89	61 09	3·50	15	0·91	9th	36·74	26·28
Ottawa (G. Wilkinson)	..	..	1·88	8	0·48	11th	32·06	..
Mount Edgecombe	96	61	2·27	8	0·94	11th	37·03	28·61
Riet Vlei (P. Otto, J.P.)	..	..	3·70	16	1·50	31st	28·91	..
Dalton (J. Pfofenhauer)	..	..	4·62	13	0·99	30th	34·14	..
Cedara (Hill Station)	90	49	5·51	12	1·17	30th	36·19	19·41
Equeefa (W. Hawksworth)	92	64	3·01	14	1·23	15th	44·84	32·18
Umzinto, Beneva (E. W. Hawksworth)..	..	..	2·64	1	0·91	14th	42·08	29·70
Branxholme (Charles Scott)	..	..	8·03	15	1·56	1st	58·97	35·05
Winkel Spruit	87	60	2·17	14	0·65	1st	36·13	35·15

Coal and Labour Return.

Return of Coal raised and Labour employed at the Natal Collieries for the month of March, 1907 :—

Name of Colliery.	Labour Employed.									Output.	
	Above Ground.			Below Ground.			Unproductive Work.*				
	E.	N.	I.	E.	N.	I.	E.	N.	I.	Tons.	Cwt.
Natal Navigation ..	30	84	276	17	292	168	—	—	—	18,502	18
Elandslaagte	18	18	271	18	180	440	9	26	24	14,316	7
Durban Navigation ..	16	135	48	8	286	46	8	13	—	11,299	0
Natal Cambrian ..	12	40	149	9	301	81	2	2	1	10,416	15
St. George's	16	96	151	10	152	128	1	6	—	8,894	0
Dundee Coal Co. ..	16	11	189	9	66	369	1	—	26	8,380	3
South African	6	15	88	9	180	20	5	40	47	7,406	10
Glencoe, Natal ..	13	97	99	11	492	7	—	—	—	7,243	1
Newcastle	7	40	20	6	204	2	2	12	—	5,261	12
Natal Steam Coal Co. ..	1	47	3	2	196	2	—	1	4	3,258	14
West Lennoxton ..	5	2	65	2	35	105	—	—	—	2,780	0
Ramsay	2	10	52	4	70	102	3	6	10	2,055	12
Central	5	44	10	4	148	5	1	26	—	2,032	14
Talana (Natal) ..	[illegible]	12	20	3	83	95	1	9	13	1,718	11
Zululand	4	45	—	1	43	—	1	13	—	689	6
Woodlands	1	4	4	1	8	3	—	—	—	85	0
Dumbi Mountain† ..	1	1	—	—	—	—	—	—	—	4	0
Totals	156	701	1,445	114	2,730	1,503	34	154	125	104,344	3
Corresponding month, '06	150	733	1,176	123	2,557	1,421	46	293	171	113,125	8

* Cost charged to Capital Account. † February Return.

Maritzburg,
8th April, 1907.

CHAS. J. GRAY,
Commissioner of Mines.

Return of Coal bunkered and exported from the Port of Durban for the month of March, 1907 :—

	Tons.	Cwt.
Coal Bunkered*	40,027	11
Exported to :—		
Port St. John's	1	0
East London	3,021	13
Algoa Bay	6,338	15
Mossel Bay	370	0
Capetown	14,124	19
Mauritius	1,066	4
Beira	264	14
Total	65,214	19

* Includes H.M. Warships.

(Signed) GEO. MAYSTON,
Collector of Customs.

Custom House, Port Natal,
2nd April, 1907.

Return of Farms at Present under Licence for Lungsickness and Scab.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
A. P. Craw ..	Ladysmith	Scab	A. W. Illing ..	Minitams
		,,	V. Gama	Claypoort
J. R. Cooper ..	Nkandhla & Nqutu	Lungsickness	L. Makoba ..	Middle Drift
		,,	N. Matenjeni ..	Nquebeni
S. A. Brown ..	Underberg ..	Scab	J. A. Stone ..	
		,,	T. de C. Arbuckle ..	Kerridge
		,,	B. Phipson ..	Strathcampbell
		,,	M. Fraser ..	Winterhoek
		,,	R. C. Gold ..	Woodend
		,,	J. R Royston ..	Greenend
		,,	J. van Whye ..	Silburn
		,,	F. A. Hathorn ..	Sauguana
H. van Rooyen ..	Vryheid	,,	Jonas	Witpoort
		,,	Mjebe	Fresgewacht
		,,	Machaba	Rooipoort
		,,	Mgeslo & Co. ..	Hardscamp
	Ngotshe	,,	G. Jordaan ..	Langervacht
		,,	F. Zietsman ..	Broadacre
		,,	H. v. d. Berg ..	Wydgelegen
A. B. Koe ..	Portion of Estcourt	,,	H. J. Hatting ..	Servitude
		,,	A. H. Bennett ..	Winterton
		,,	R. P. Summergill ..	York Grange
		,,	T. Wood	British Empire
A. J. Marshall ..	Dundee	,,	R. J. du Bois ..	Giba
		,,	J. W. de Bruyn ..	Rooifontein
		,,	C. M. Vermaak ..	Paddock
		,,	L. W. Meyer ..	Langverwacht
		,,	A. L. Jansen ..	Strathearn
		,,	J. O. Nel ..	Earnscliffe
		,,	A. C. Vermaak ..	Sigtuna
		,,	T. C. Vermaak ..	Harriotdale
		,,	H. Vermaak ..	Paddock
E. Varty ..	Western Umvoti ..	Lungsickness	W. J. Slatter ..	Holm Lacy
		Scab	H. Hansmeyer ..	On Rust
		,,	O. H. van Rooyen, senr.	Good Hope
J. J. Hodson ..	Ptn of Lion's River	Lungsickness	Mrs Vear	Brookdale
		Scab	G. H. Burgmann ..	Boschhoek
		,,	W. A. Dales ..	Gowrie
		,,	N. McKellar ..	Glenafton
		,,	R. Spiers	Moyeni
R. Mayne ..	Krantzkop ..	,,	W. W. Mare ..	Doornhoek
		Lungsickness	P. R. Nell ..	Broeder's Hoek
		,,	Maqamganse ..	Loots Hoek
		,,	Uqupu	Myoniezwe's Locat'n
		,,	Ndabane .. .	,,
		,,	S. Johnson & Co. ..	Inadie Store
		,,	Ndabane	Myoniezwe's Locat'n
		,,	Natives	Spitzkop
		,,	,, ...	Myoniezwe's Locat'n
		,,	J. S. van Rooyen ..	Spring Grove
		Scab	P. J. Nel	Ungegund
A. H. Ball	Weenen	,,	J. J. Vermaak ..	Winterhoek
		,,	L. J. & T. C. Lotter	Waterfall
		,,	I. J. Meyer ..	Victoria
A. Brown	Polela	,,	L. Molefe	F. P. 142, Polela
L. J. Trenor ..	Harding	,,	R. Mack	Wetherby
G. Daniell ..	Vryheid ..	,,	J. R. Steenkamp ..	Bloemhof
		,,	G. Combrink ..	Goedehoop
		,,	D. Coetzee ..	Rustplaats
		,,	J. E Greig ..	Mansfield
		,,	J. Wiggett ..	Bloemhof
R. Mayne ..	Eastern Umvoti ..	Lungsickness	C. van Rooyen ..	Boschfontein
		,,	D. A. Nel	Glen Boig
		,,	Nkabi and others	Loots Hoek
J. Button	Portion of Estcourt	,,	J. Bird	Mooi River T'n Lds.
		Scab	J. Phipps	Littlecote
E. Parkinson ..	New Hanover ..	,,	Ndabeni and Jim ..	Location
A. Hair	City and Umgeni ..	,,	Umbabana ..	Zwaartkop Location
D. M. Pfaff ..	Utrecht	,,	F. Badenhorst ..	Zaaihoek
		,,	G. S. Dicks ..	Groot Vlei

MANGE IN HORSES EXISTS AS UNDER.

Name.	District.	Name.	District.
W. E. Oates	Bergville	Nseleni	Underberg.
H. Turner	Lidgetton	A. G. Stafford	Harding
Mboyea	Bergville.	R. Thompson	New Leeds

Market Reports.

(*Responsibility for the accuracy of the Statements and Opinions of the following Reports rests with the respective Contributors.*)

JOHANNESBURG.—Mr. Alfred Webb, P.O. Box 2342 (representing the Farmers' Co-Operative Association of Cape Colony), under date 10th April, reports :—

Fruit—Bananas, 3s to 3s 6d per hundred; pineapples, 1s to 1s 9d per dozen. *Butter*—10d to 1s 6d per lb. *Eggs*—New laid, 2s 9d to 4s 6d per dozen. *Bran*—8s to 8s 6d per 100 lbs. *Chaff*—3s to 3s 3d per 100 lbs. *Forage* (local)—6s 6d to 7s per 100 lbs. *Hay* (sweet)—2s per bale. *Kafir Corn*—11s to 12s 6d per bag of 200 lbs net. *Lucerne* (green)—33s 4d per 100 bundles. *Mealies*—Yellow, 12s to 12s 3d; white, 12s to 12s 6d; mixed, 12s per bag of 200 lbs. net. *Onions*—9s per bag of 120 lbs net; seed, 10s to 12s 6d per bag of 130 lbs net. *Potatoes*—13s 9d to 19s per bag of 160 lbs net. *Sweet Potatoes*—10s 6d per bag of 120 lbs net. *Oxen* (dressed)—35s to 38s per 100 lbs. *Pigs*—3d to 8½d per lb (live weight); each, 17s to 25s. *Sheep*(dressed)—5d to 6d per lb. *Ducks*—2s to 2s 6d each. *Fowls*—1s 6d to 3s. each.

Pound Notices.

NOTIFICATION is made in the *Government Gazette* relative to the sale, on Wednesday, 15th May, of certain impounded stock. The cattle will be sold by the respective poundkeepers at 12 noon on that date unless previously released. The pounds in question and descriptions of the stock are as follows :—

Estcourt.—(1) Five Kafir goats, mixed, no marks. (2) Four Kafir goats, one white, two black, and one red, all marked, cuts on front legs.

Finchley (Ixopo Division).—Bay mare, black points, indistinct brand on off shoulder, hog mane and tail.

Good Luck (Dronk Vlei).—Black mare, white star on forehead, long mane and tail, no brands.

Howick.—(1) Chestnut mare, pony, appears blind in the left eye, three white feet and blaze. (2) Bay mule, light coloured nose, branded P.D. on neck, A.L. on near hind quarter, found straying at Woodside by Natal Police.

Melmoth.—(1) Black cow, white patches on belly, long horns, branded P.B. on off hind leg, age about 12 years. (2) Red and white bull calf, age about four months, belonging to above cow. (3) Black heifer, age about 12 months, no marks or brands. The above cattle were impounded by G. Theunissen, of Emkini, on 22nd March.

Richmond—(1) Red toli, no marks or brands (running on farm "Osgodby," and reported by Mr. W. C. McKenzie as too wild to be driven to the pound). (2) Bay mare and bay foal (running on the farm "Penavon," and reported by Mr. A. Harcourt as too wild to be driven to the pound). This mare was found entangled in a barbed wire fence, and has been badly cut about.

Waschbank.—Black and white bull stag, old, branded I-C, probable value about £4 (running on farm "Balbrogie," Biggarsberg, and reported to be too wild to be driven to the pound).

Executives of Farmers' Associations.

ALFRED COUNTY FARMERS' ASSOCIATION.—President: A. G. Prentice, J.P. Vice-Presidents: C. Knox, J.P., L. T. Trenor. Committee: C. M. Etheridge, E. J. Gray, W. B. Rethman, H. W. F. Rethman, C. A. Howell, R. E. H. Fann, J.P., W. T. J. Gold, Dr. Case, Revd. S. Aitchison. Hon. Treasurer: H. C. Hitchins. Secretary: T. Tribe.

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CAMPERDOWN AND DISTRICT FARMERS' ASSOCIATION.—President: John Moon. Vice-President: F. N. Meyer. Hon. Sec.: L. Baker.

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NOTTINGHAM ROAD FARMERS' ASSOCIATION.—President: W. Henwood, J.P., Vice-President: B. Greene; Auditor: A. Mengens; Secretary and Treasurer: C. J. King, Nottingham Road.

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ROYAL AGRICULTURAL SOCIETY OF NATAL.—President: Sir G. M. Sutton, K.C.M.G. Vice-Presidents: His Worship the Mayor, Messrs. Jas. King, O. Hosking, D. C. Dick, Col. E M. Greene and P. D. Simmons. Executive: Sir G. M. Sutton, President; Messrs. Jas. King, O. Hosking, D. C. Dick, Col. E. M. Greene and P. D. Simmons, Vice-Presidents; Committee: G. J. Macfarlane, W. S. Craft, W. H. Cobley, H. J. Stirton, W. J. O'Brien, L. Line and Sir T. K. Murray. Yard Superintendent: H. J. Stirton. Secretaries, Treasurers and Collectors: Duff, Eadie & Co., 12, Timber Street, Pietermaritzburg. Auditor: G. V. Lambert.

SLANG RIVER (UTRECHT) FARMERS' ASSOCIATION.—Chairman: P. J. Kemp; Executive Committee: J. J. Uys, J. Z. Moolman, T. J. Botha, P. J. Viljoen, P. J. Kemp; Hon. Sec. and Treasurer, Thys Uys, Utrecht P.O.

UMVOTI AGRICULTURAL SOCIETY.—President: Major T. Menne. Vice-Presidents: Theunis J. Nel, M.L.A., W. J. Slatter, W. L'Estrange. Executive Committee: Tol Nel, A. Newmarch, W. Lilje, O. Rottcher, S. C. Van Rooyen, W. Newmarch, E. J. Van Rooyen, O. Norton, I. M. Nel, J. Browning. Managers of Show Yard: J. M. Handley and N. Hunter. Hon. Auditor: W. K. Ente. Secretary and Treasurer: W. H. Gibbs.

UPPER BIGGARSBERG FARMERS' ASSOCIATION.—President: George Langley; Vice-President: W. L. Oldacre; Secretary: J. H. Murray.

UTRECHT AGRICULTURAL SOCIETY.—Chairman: L. Viljoen; Vice-Chairman: B. H. Breytenbach; Members: I. Bierman, M. M. Knight, J. H. Klopper, B. C. Hattingh, T. Botha, M. Gregory, P. L. Uys, H. P. Breytenbach; Secretary: G. J. Shawe.

VICTORIA COUNTY AGRICULTURAL SOCIETY.—President: Lieut.-Colonel F. Addison; Vice-Presidents: Sir Liege Hulett, Kt., M.L.A., W. J. Thompson, Esq., J.P., J. Polkinghorne, Esq., M.L.A.; Committee: Messrs. W. H. B. Addison, G. S. Armstrong, M.L.A., C. Bishop, J.P., D. Brown, sen., J.P., W. Campbell, T. G. Colenbrander, A. E. Foss, J.P., A. S. L. Hulett, J.P., J. B. Hulett, C. Jackson, G. Nicholson, J.P., T. Polkinghorne, J. W. Perkins, J.P., E. Saunders, J.P., G. Stewart, and J. H. Stansell; Hon. Secretary and Treasurer: H. Curtis Smith (Stanger)

WEENEN AGRICULTURAL SOCIETY.—President: A. F. Henderson, Esq., C.M.G.; Vice-Presidents: J. Button, J.P., Jas. Ralfe, J.P., H. Blaker, J.P., E. B. Griffin, J.P.; Hon. Treasurer: F. C. Schiever; Auditor: S. Wolff; Executive, Hon. H. D. Winter, R. H. Ralfe, J. W. Moor, D. W. Mackay and Allan Stuart; Manager of Show Yard: S. Vaughan; Assistant: A. Clouston; Hon. Secretary: E. Cautherley.

WEENEN COUNTY HORTICULTURAL SOCIETY.—Committee of Management: A. F. Henderson, C.M.G., F. C. Schiever, G. W. Linfoot, P. J. Nunn, Dr. Brewitt, S. Vaughan; Hon. Secretary: E. Cautherley.

ZULULAND COAST FARMERS' ASSOCIATION.—President: G. H. Hulett; Vice-President: C. Hill; Hon. Secretary and Treasurer: F. Brammage, Ginginhlovu.

(The Editor will be obliged if the Hon. Secretaries will supply him with lists of the Executives of their Associations.)

Central Experiment Farm, Cedara.

In order to minimise interference with the general course of work on the Central Experiment Farm, Cedara, it has been found necessary to set apart one day of the week, namely, Friday, as a visitors' day.

Arrangements will accordingly be made on that day for receiving visitors and showing them round the Farm. A trap will be at Cedara Station to meet the up 9.50 a.m. train; and if intending visitors from up-country will give notice to the guard at Howick Station, on their way down, a trap will be sent to meet the train which passes through Cedara at 11.2 a.m. Visitors travelling by other trains will also be met if they will previously make arrangements by writing.

On other than the visitors' day, visitors may be received by appointment, but special attention cannot be guaranteed in regard to their being shown round.

At least clear fourteen days' notice must be given by Associations, so that there may be time to make all necessary arrangements.

W. A. DEANE,
Minister of Agriculture.

9th April, 1907.

Agricultural Shows.

HIMEVILLE, Thursday, 16th May.—President: H. C. Gold. Hon. Secretary: Thos. E. Marriott, Brookedale, Polela.

BULWER, Wednesday, 22nd May.—All entries close 10th May. President: J. Isbister. Secretary: D. McK. Malcolm, Bulwer.

ROYAL AGRICULTURAL SOCIETY, 13th, 14th and 15th June.—All entries close 1st June. President: Sir G. M. Sutton. Secretaries: Messrs. Duff, Eadie & Co., 12, Timber Street, Maritzburg.

ESTCOURT, Wednesday, 19th June.—All entries close 8th June. President: A. F. Henderson. Secretary: E. Cautherley, Southdowns, Estcourt.

HARDING, Thursday, 20th June.—All entries close 6th June. President: A. G. Prentice, J.P. Secretary: Thos. Tribe, Harding.

DUNDEE, Thursday, 27th June.—All entries close 12th Jane. President: F. Turton. Secretary: J. McKenzie, Dundee.

HOWICK, Thursday, 27th June.—All entries close 12th June. President: Graham Hutchinson. Hon. Secretary: Arthur F. Dick, Howick.

NEWCASTLE, Friday, 28th June.—All entries close 18th June. President: F. A. R. Johnstone, M.L.A. Secretary: Wm. Beardall, Newcastle.

LADYSMITH, Friday, 5th July.—All entries close 30th June. President: Herman Illing. Secretary: E. Scott, Box 90, Ladysmith.

UMZINTO, Thursday, 11th July.—All entries close 9th July. President: W. Thomson. Secretary: George Lamb, Umzinto.

DURBAN, 18th, 19th and 20th July.—President: W. R. Poynton. Secretary: J. D. Ballance.

RICHMOND, Thursday, 25th July.—All entries close 12th July. President: John Marwick. Hon. Secretary: T. McCrystal, Box 32 Richmond.

DATES NOT FIXED.

GREYTOWN (Date not fixed).—President: Major T. Menne. Secretary: W. H. Gibbs, Greytown.

MID ILLOVO (Date not fixed).—President: B. B. Evans. Secretary: C. B. Lowe, Mid Illovo.

NEW HANOVER (No Show on account of E. C. F.).—President: R. H. Oellermann. Secretary: W. D. Stewart, New Hanover.

NOODSBERG ROAD (Date not fixed)—President: Fritz. Reiche, J.P. Secretary: Paul Vietzen, P.O. Singletree.

STANGER (Date not fixed).—President. F. Addison. Secretary: H. C. Smith.

OTHER SHOWS.

PIETERMARITZBURG HORTICULTURAL SOCIETY, 17th October.—President: T. R. Sim, F.L.S. Hon. Secretary: S. Colman, Deeds Office, Maritzburg.

Brands Allotted to Infected Magisterial Divisions.

The following is a list of the brands which have been allotted to the several infected Magisterial Divisions:—Durban County, D. 2; Alexandra County, A. 2; Lower Tugela; T. 2; Mapumulo. S. 2; Inanda, B. 2; Umsinga, U. 2; Dundee, X. 2; Vryheid, V. 2; Ngotshe, H. 2; Paulpietersburg, P. 2; Nongoma, G. 2; Mahlabatini, L. 2; Ndwedwe, N. 2; Weenen County, W. 2; Umvoti, F. 2; Hlabisa, K 2; Eshowe, E. 2.

East Coast Fever.

SLAUGHTER CATTLE.

THE Department of Agriculture has erected abattoirs adjoining the Government Cold Stores, Maritzburg, where people will be able to forward cattle from clean and infected areas for slaughter. Killing, chilling, and freezing can be undertaken by the Department if desired, and arrangements can also be made for the forwarding by rail of meat intended for sale in markets outside Maritzburg. This will enable farmers, who wish to dispose of their stock for slaughter and find a difficulty in so doing, to have their animals killed in Maritzburg and the meat forwarded to Durban or any other market. The abattoirs will be under the personal supervision of Mr. A. R. Burford, the Manager of the Government Cold Stores, who is thoroughly experienced in this particular class of work.

The provisional abattoir charges are :—

Cattle per head ...	...	1s., with a minimum of £3 per killing space per month.
Sheep	...	1½d. each.
Pigs...	...	3d. „
Chilling and Freezing Beef,	1st week ...	1s. 3d. per qr.
„ „	2nd „ ...	1s. „
„ „	Remaining weeks ...	9d. „
Sheep	per week ...	3d.
Pigs	„ ...	6d.

Charges for killing and handling Cattle and placing same in Cold Storage, if required, or meat to be taken away by customer from hanging-room :—

Cattle, per head	4s. each (including abattoir fee).
Sheep	6d. „
Pigs	1s. „ up to 200 lbs.
„	1s. 6d. each, over 200 lbs. & up to 300 lbs.
„	2s. „ over 300 lbs.

W. A. DEANE,
Minister of Agriculture.

Department of Agriculture, Maritzburg,
9th April 1907.

MOVEMENT OF CATTLE IN YOKE.

It is hereby notified, for general information, that, notwithstanding the prohibition contained in Government Notice No. 175, 1907, under which movement of cattle within the Magisterial Divisions of Umvoti and Krantzkop was prohibited, the movement of cattle in yoke for the purpose of transporting produce and supplies will be permitted within such Magisterial Divisions outside the areas described in the schedule to this notice, upon permission in writing being first had and obtained from the District Veterinary Surgeon or Stock Inspector of the District, and subject to any directions or limitations which may be imposed in the permission given.

W. A. DEANE,
Minister of Agriculture.

Department of Agriculture,
Pietermaritzburg,
8th April, 1907.

SCHEDULE.

The whole of the Tugela Native Location, in the Magisterial Division of Krantzkop.

The whole of the Umvoti Native Location, in the Magisterial Divisions of Umvoti and Krantzkop.

The area lying within the outer fenced boundaries of the following farms :— Scheeper's Dale, Springfield, Thornton, Noitdocht, Mt. St. Bernard, Geluk's Stadt, Huis River, Deepdale, Lunenberg, Nels Rust, Roodebok Vlakte, Sub-division A of Winter Hoek, Krantzkloof, Landsberg, Mt. Ernestina, and the North Western corner of Summerfield.

Model Rules for Agricultural Co-Operative Societies.

THE Department of Agriculture has for disposal, at the rate of one shilling each, copies of Model Rules for the use of Agricultural Co-operative Societies. Applications should be made to the Secretary, Minister of Agriculture, Pietermaritzburg.

Trees for Sale.

TO encourage tree-planting, transplants and seeds of forest trees are supplied by Government, so far as in stock, at the undermentioned rates, exclusive of carriage, from the Government Nursery, Central Experimental Farm, Cedara.

Transplants of Eucalyptus, Pines, Acacias, Casuarinas, Cupressus, etc., about 25 trees in each tin, at 8s. 4d. per 100 trees. Trees in separate tins at 1s. each.

Transplants of scarce kinds, larger trees, or surplus stock, when available, will be charged at special rates, which will be furnished on application.

Tree seeds, in variety, at 1s. per packet. Price per pound, which fluctuates, will be furnished on application.

Package and postage of seed, when required, charged 1s. per lb. extra.

Orders for present or spring delivery should be addressed to the **Forester, Cedara,** and must be accompanied by a remittance in cash or postal order. Cheques cannot be accepted.

T. R. SIM,
Conservator of Forests.

Employment Bureau.

THE Department of Agriculture has received applications from the undermentioned, who are prepared to become assistants or apprentices on farms. The Department will be glad to hear from farmers willing to take young men as assistants, and to place them in correspondence with the various applicants. When communicating on the subject, farmers may refer to the applicants by quoting the numbers in the following list:—

No. 92a.—Englishman, 50 years of age, with varied experience in tea and coffee planting in Ceylon, and also of contract work. Has also been on a Sugar Estate, and has had experience in pig rearing. Salary needed.

No. 93—Young lady, 20 years of age, trained at the Reading Agricultural College and holding certificates for Poultry and Dairying, desires situation on a farm. Is prepared to take entire charge of poultry and dairy and, if required, would accept payment on results. Stated to be keen worker and thoroughly practical.

No. 94.—Scotchman, who has lived all his life in South Africa, desires employment on farm in connection with stock if possible. Was a Head Conductor during Boer War. Was 2 years with Transvaal P.W.D. as handyman. Produces good references. Desires salary.

No. 95.—German, of respectable appearance, who speaks English fluently, desires employment on a farm. Is 48 years of age, and has been accustomed to farm work, wire fencing, masonry, carpentry, &c. Salary required.

No. 97a.—Colonial, aged 22, bricklayer by trade, speaks Zulu, Dutch, and Hindustan, desires employment as a farm hand. Was on a farm in vicinity of Pretoria for six months.

No. 98.—Englishman, 25 years, desires situation on sheep and stock farm. Had experience of sheep on father's farm in Lincolnshire. Has been four years in Natal.

No. 99.—Englishman, 17, Colonial born, anxious to learn farming. No previous experience.

No. 100.—Englishman, 23, with experience gained in Richmond district, desires to get on to farm further up country. States he is active and not afraid of work. Wage no particular object.

Diamond Drilling.

Some of the departmental diamond drilling plants are at present disengaged and available for hire for boring for either minerals or water. Particulars as to terms of hire may be obtained from the undersigned.

CHAS. J. GRAY,
Commissioner of Mines.

Bulletins Issued by the Department of Agriculture.

Single copies may be obtained free (excepting those with price attached) on application to the Secretary, Minister of Agriculture.

No.
1.—"Notes on Fruit Culture," by Claude Fuller. [1902]. *(Out of print).*
2.—"Manures on the Natal Market, 1902," by A Pardy. [1902].
3.—"Insects in an Important Rôle," by Claude Fuller. [1904]. *(Out of Print).*
4.—"Manures on the Natal Market, 1903," by A. Pardy. [1903].
5.—"Weed Circular," by Claude Fuller. [1905].
6.—"Manures on the Natal Market, 1904," by A. Pardy. [1904].
7.—"Tree-planting in Natal," by T. R. Sim. [1905]. *(Price 2s. 6d.)*
8.—"Agricultural Co-operation," by E. T. Mullens. [1905].
9.—"Potato Culture" by A. N. Pearson. [1905].
10.—"Manures on Natal Market, 1905," by A. Pardy. [1905].
"Agricultural Statistics, Natal, 1904-5." [1906].
11.—"East Coast Fever," by S. B. Woollatt. [1906].
12.—"Manures on Natal Market, 1906," by A. Pardy. [1906].

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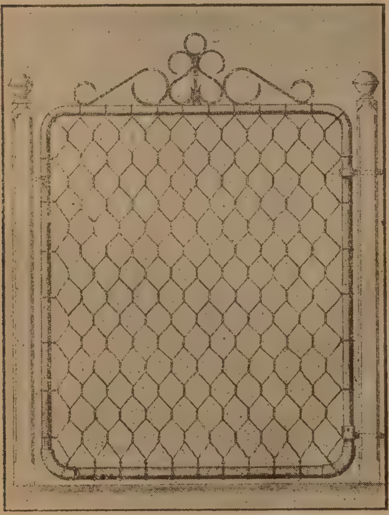

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Mr. T. W. LAKE, of Tankatara, C.C., writes on 27th February, 1907:—

"On several occasions I have used your 'Gallsickure,' and found it an excellent" "remedy for Galziekte in sheep and calves, and would advise all farmers to" "keep a good supply and give it a fair trial."

Mr. E. BÖHME, Bothmansrust, Schwerje Reneke, Western Transvaal, writes on the 19th February, 1907:—

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(REGISTERED).

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I have used your Condition Powder and have found it to surpass anything I had tried. My horses felt the benefit of the Powder before many days, and I find that the use of the Powder for a few days from time to time, keeps them in perfect condition and free from disease of every description.

Yours faithfully, EUGENE RENARD.

TO LENNON LIMITED, Durban. THE BRICK YARDS, UMGENI, DURBAN, NATAL,

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For many years past I have purchased Bentley and Vanderpump's Condition Powders as a Medicine for the Horses and Mules in use at my Brick Fields, and I must say that I cannot estimate the value of the Powders sufficiently, as my stables are always free from sickness, and I have never had any serious outbreak among my stock, which I put down entirely to the regular use of your Powders.

They seem to be the only preventive of Horse Sickness that I know of.

You are at liberty to make what use you like of this letter. Yours faithfully, J. J. JOHNS.

MESSRS. LENNON LIMITED, West Street, Durban. WENTWORTH, NATAL.

DEAR SIRS, *September 30th, 1903.*

I have used Bentley & Vanderpump's Horse Condition Powders continuously during the last ur years, and am fully convinced that they act as a preventive, and I have to thank them for the fact that my horse did not take sickness last season when horses died all round me.

I am never without B. & V. Powders in the stable. Yours faithfully, H. A. JACOB.

THIS Powder should be given to all Horses occasionally; it keeps them in good condition by giving tone to the Stomach and purifying the blood. For Grease, Swelled Legs, Coughs and Influenza, it is the Best Remedy.

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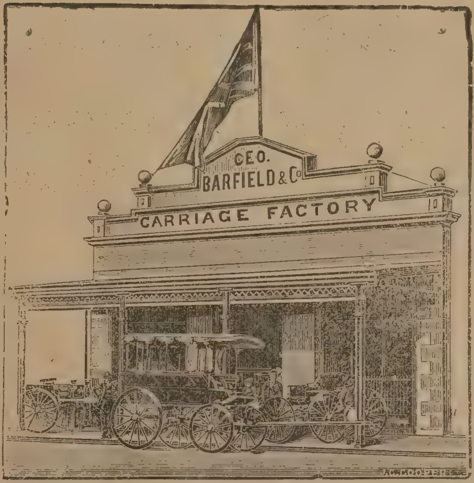

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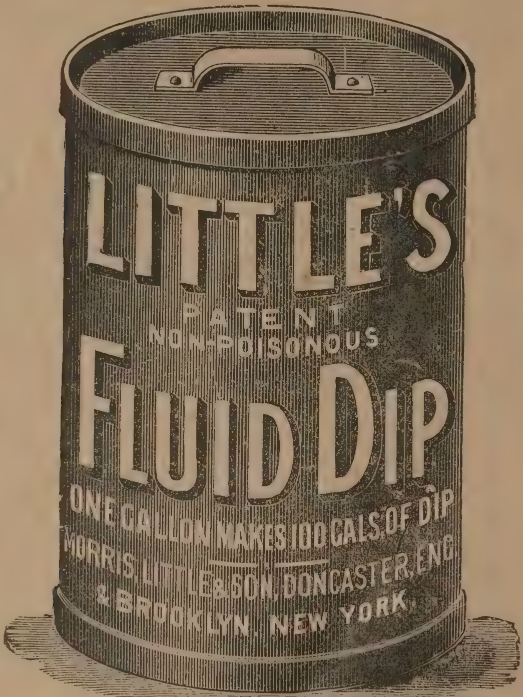
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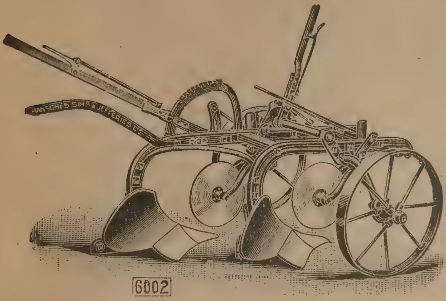

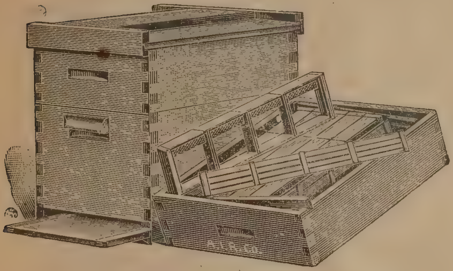

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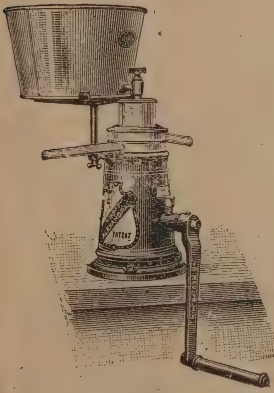

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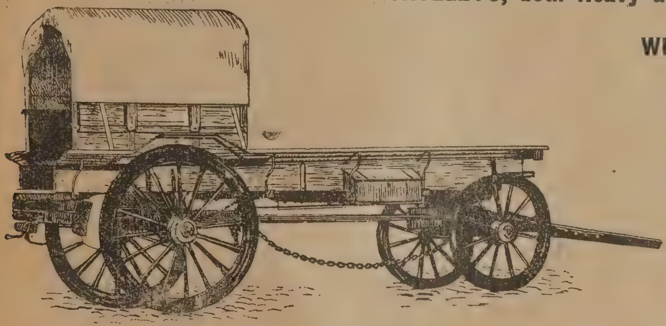

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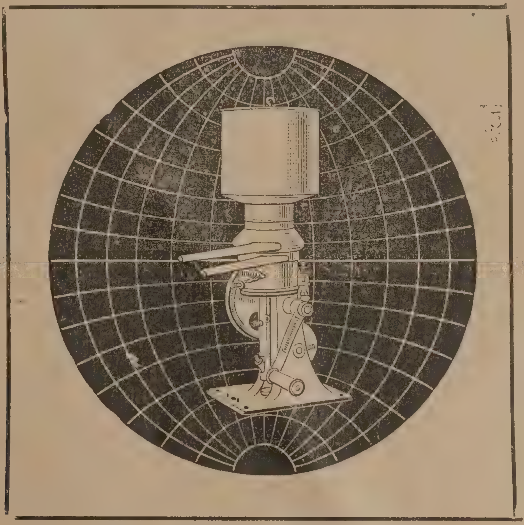

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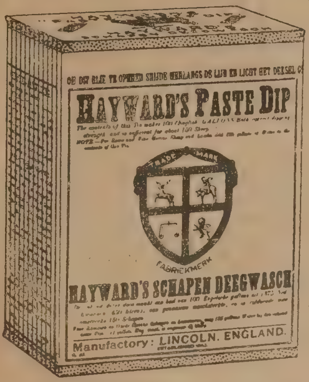
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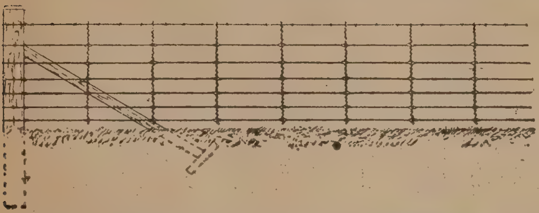

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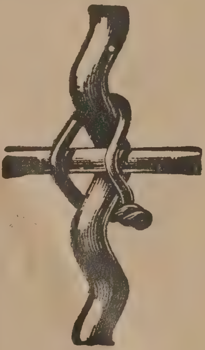

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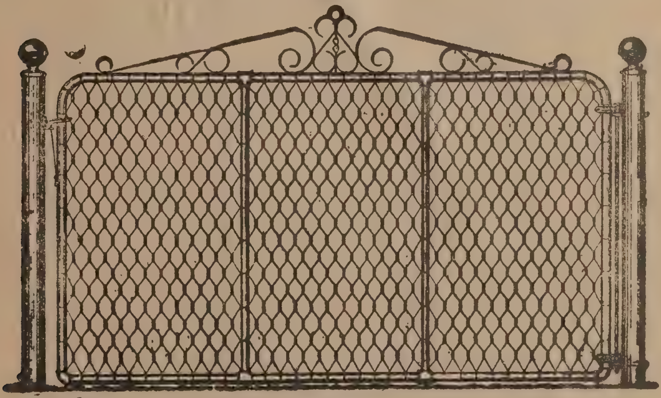

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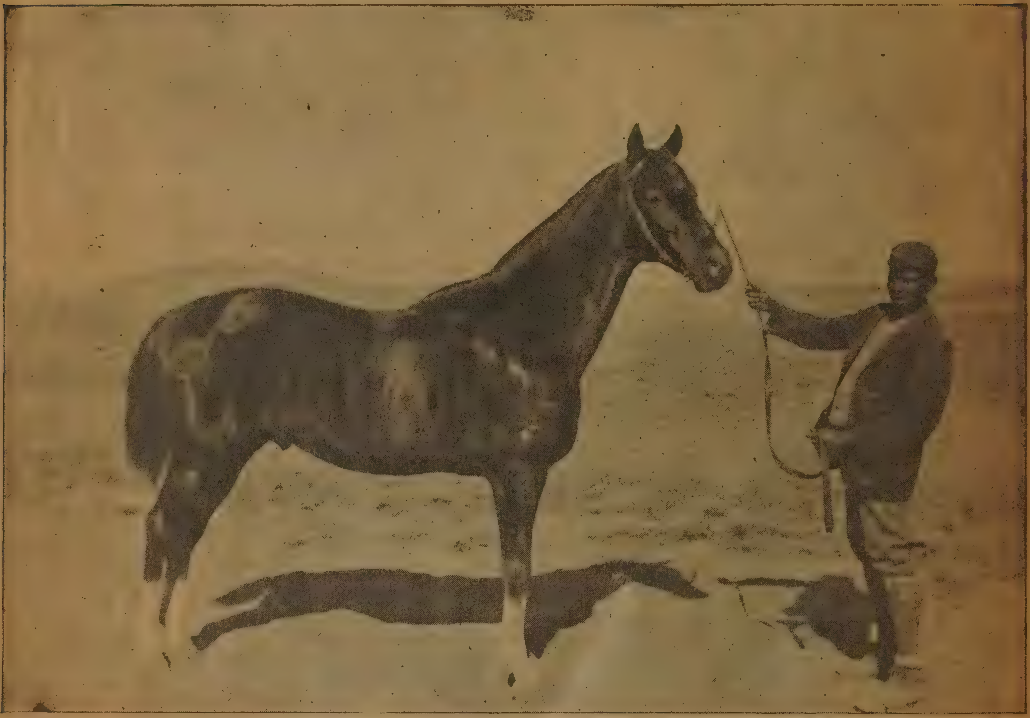

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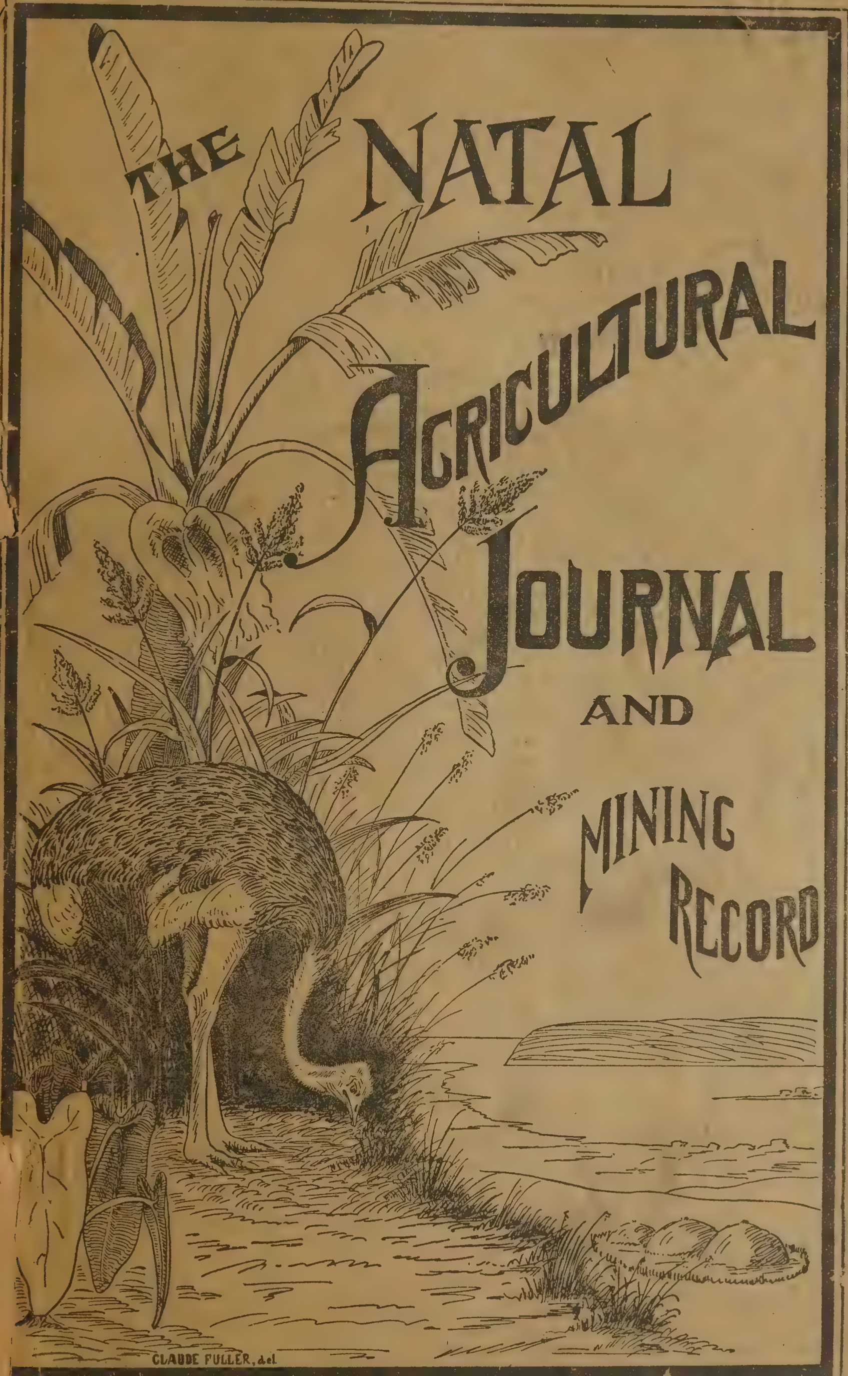

THE NATAL AGRICULTURAL JOURNAL AND MINING RECORD

CLAUDE FULLER, del.

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The Journal is issued on the Fourth Friday of every month.

Literary Communications to be addressed to the Editor, "Agricultural Journal," Department of Agriculture, Maritzburg.

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Vol. X., No. 7. *JULY 26, 1907.*

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NATAL AGRICULTURAL JOURNAL

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Published for and Edited in the Department of Agriculture.

Publishers:
THE "TIMES" PRINTING AND PUBLISHING COMPANY, LIMITED.

1907.

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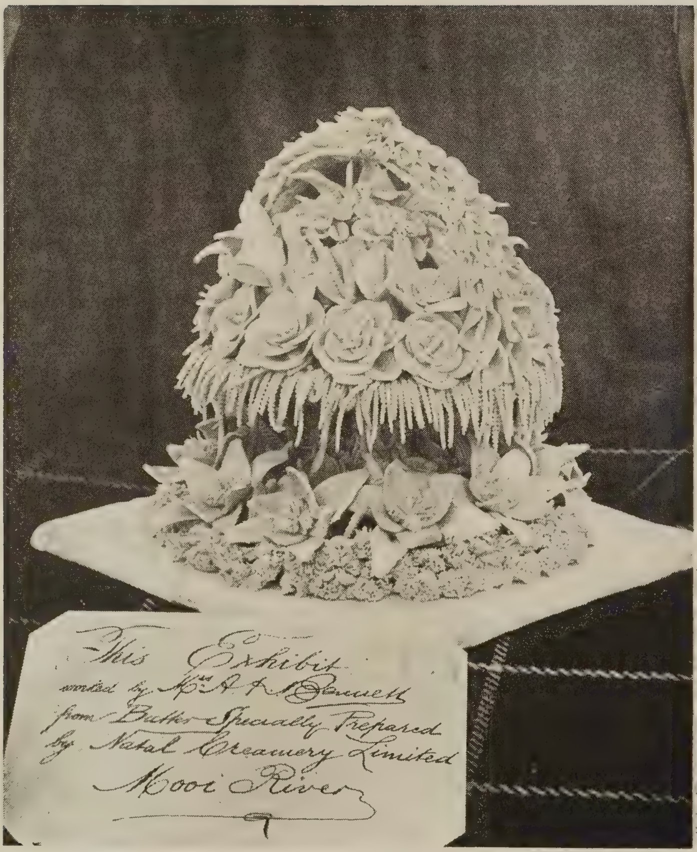
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ERRATA.

ON page 775, Table IV., in respect of agricultural implements, etc., in possession of Europeans on the 31st August, 1906, and not 1905, as printed. The same error occurred in Table V. on page 776: the date should read 31st August, 1906, instead of 1905.

The statistics of which these tables form part are for the year ended 30th June, 1906, and not for the year ended 30th January, as printed—*vide* page 772.

VOL. X. No. 7. JULY 26, 1907.

Natal Agricultural Journal and Mining Record.

Paddock Feeding of Pigs.

By E. R. SAWER, Director, Experiment Stations.

THREE periods of growth may be distinguished in the life-history of the bacon hog, namely, from birth to weaning, a period of frame and muscle development, and, lastly, the time occupied in a process of fattening and finishing. During the second period plenty of exercise and abundance of green forage and roots are essential. The pig is by nature a grazing animal. It is impossible to turn a profit upon sty-raised hogs fed largely upon maize at its present value. A constant maize ration is injurious to health, is too fattening, makes greasy pork, and does not supply sufficient material for the growth of frame, lean meat and muscle. Paddocks of bean, rape, lucerne, sweet potatoes, monkey nuts, pumpkins, buckwheat and paspalum are essential, and with a small daily ration of maize, oats, barley or mealie bran, in as great a variety as possible, will furnish pork at the lowest possible price and of the best obtainable quality. It has been repeatedly shown that, while it takes from 4½ to 6 ℔s. grain sty-fed to make 1 ℔. pork, the same gain can be made from 1 to 2 ℔. grain, and as much green forage and roots as the hog will eat. Pigs kept in paddocks are less trouble, thrive better, and fatten more rapidly than sty-fed animals.

In demonstration of these facts a series of feeding experiments have been organised at the Winkel Spruit Experiment Farm. Acre paddocks have been fenced and planted with ground nuts, sweet potatoes, beans and arrowroot respectively, and the results from the first two mentioned crops are now to hand. Twelve hogs of the average weight of 43 ℔s. were selected for the experiment, and paddocked on the 18th May. At the end of the first week a total gain of 80 ℔s. in live weight was shown, or, approximately, 1 ℔. per diem in individual animals, due entirely to the ground nut forage, no additional ration being fed. The second week's feeding resulted in a further total gain of 66 lbs. in live weight, equal to an average individual gain of 5½ lbs. During the third week an additional daily ration of 1 lb. mealie meal and 1 lb. of potatoes per hog was supplied. The total gain, however, was less than in the preceding week, namely, 63 lbs., a result which would appear to clearly indicate exhaustion of the forage. The hogs were accordingly removed to the adjoining paddocks containing a heavy crop of sweet potatoes.

PIG FEEDING IN PADDOCK OF GROUND NUTS.

Number of Hogs.	Date of Weighing.	Weight. lbs	Gain. lbs.
12	18/5/07	515	...
12	25/5/07	595	80
12	1/6/07	661	66
12	8/6/07	724	63*
		Total Gain in 21 days	209 lbs.

* Also fed daily ration of 1lb. mealie meal and 1lb potatoes.

With a view to determining whether this rapid and healthy growth could be further accelerated by the addition of a small grain ration, the pigs while running in the sweet-potato paddock were fed daily one pound of mealie meal, and the following encouraging results secured:—

PIG FEEDING IN PADDOCK OF SWEET POTATOES.

Number of Hogs.	Date of Weighing.	Weight. lbs.	Gain. lbs.
12	8/6/07	724	...
12	15/6/07	778	54
12	22/6/07	927	149
		Total Gain in 14 days	203*

* Also fed daily ration of 1 lb. of mealie meal.

INDIVIDUAL GAINS OF HOGS.

Number.	18/5/07 lbs.	22/6/07 lbs.	Number.	18/5/07 lbs.	22/6/07 lbs.
1	52	86	7	38	72
2	52	84	8	46	82
3	30	61	9	43	75
4	54	102	10	33	63
5	41	62	11	36	65
6	44	83	12	46	92

Average individual gain in 5 weeks, 34⅓ lbs.

It will thus be seen that, as stated above, a uniform increase in live weight can be maintained at the rate of 1 lb. per diem, at the cost of 1 lb. of mealie meal, and as much green forage as the hog will eat. An acre of well-grown ground nut has been found capable of carrying 30 pigs for a period of 3 weeks, and a similar area of sweet potatoes the same number of pigs for 10 weeks.

(*To be continued.*)

Notes and Comments.

CAPE MEALIES IN LONDON.—In the course of a recent report, appearing in the *Cape Times*, on Cape products on the London market, Mr. Chiappini says, with reference to maize: "Messrs Campbell & Phillips state that the Cape maize, that is, the yellow, hard, small mealies, is 9d. to 1s. per 480 lbs. above the best market-price of maize from any other country."

CAPE SECRETARY FOR AGRICULTURE.—In the *Cape Government Gazette* of the 11th June announcement is made of the resignation of the Hon. Arthur J. Fuller, M.L.A., Secretary for Agriculture. In his place has been appointed the Hon. Colonel Charles Preston Crewe, C.B., M.L.A., who has resigned from the office of Colonial Secretary. Mr. Fuller has been appointed a Minister without portfolio. The Hon. Sir Pieter Hendrick Faure, K.C.M.G., M.L.A., takes Colonel Crewe's place as Colonial Secretary.

CO-OPERATIVE BUTCHERIES.—Of interest as showing the development of the progressive spirit among our farmers is the resolution carried unanimously at a meeting of the Dronkvlei Farmers' Association held last month regarding the establishment of co-operative butcheries. On the motion of Mr. A. C. Camp, it was resolved "that this association approach other farmers' associations of the Colony, with a view to establishing co-operative butcheries in the towns, in order to make farmers independent of existing butchers' rings." According to the report of the proceedings furnished to his paper by the *Natal Witness* correspondent at Creighton, Mr. Camp said that it was plain that farmers were at the mercy of the butchers, and if they hoped to sell their slaughter cattle at a fair price before they all died of tick fever, which was quite possible, they would have to join together and establish co-operative butcheries in the towns, and sell at a fair price to themselves and the consumers, and there was no reason why they should not do it now, as the Government had given them every facility to do so by establishing the abattoirs and cold storages in the towns. The resolution passed by the association is certainly a step in the right direction; but it will be remembered that a similar project brought forward by the Natal Agricultural Union a few years ago fell to the ground owing to lack of support from the farming community.

O.R.C. "WOOL MEETINGS."—The Department of Agriculture of the Orange River Colony is holding, during the months of July, August and September, a series of meetings of wool-growers in various parts of the Colony, for the discussion of matters in connection with wool production and export. Mr. McNab, the Government Wool Expert, will give practical advice to farmers; and Mr. C. von Maltitz will open a discussion on the scab insect, its life history and habits, illustrated by diagrams. In all 49 meetings are advertised to take place.

AGRICULTURE IN ESHOWE DISTRICT.—The farmers around Eshowe are making an appreciable difference in the appearance of the country that a year ago was green veld, writes a correspondent. A good deal of ground has been ploughed over, and little places put up as residences upon the farm. Unfortunately, East Coast Fever has kept many from doing as much as they would otherwise have done had there been no restriction upon the movement of cattle. These restrictions have undoubtedly, our correspondent says, kept the district clean. "It is peculiar," he adds, "but many people assert that there has been no case of East Coast Fever here, because it did not become virulent and sweep half the country-side. They won't give credit to the precautions used." There have been several suggestions of co-operation by farmers, but so far nothing material has been done. Co-operation will be necessary, our correspondent says, to handle and store the good crop of mealies which is expected if the locusts are grappled with in the voetganger stage.

PAPER BOTTLES FOR MILK.—The *Scientific American* refers to the introduction of paper bottles for the retail supply of milk. As is pointed out, to wash milk bottles clean is difficult—often very difficult—and cannot be done except in boiling water. Men cannot, however, work in boiling water, and so lukewarm or tap water is used. "Evidently the glass bottle is a misfit, and wrong." The solution of the difficulty, it is said, is the abandonment of the glass bottle and the substitution therefor of the single-service paper package for milk. A paper bottle that is about to be placed on the market is in the form of a plain paper cylinder, with top and bottom. This "bottle" is made of spruce-wood paper; and, though it weighs less than an ounce, it is quite strong and will, it is stated, support a vertical crushing strain of more than a hundred pounds when filled. A paraffin coating renders the paper impervious to moisture, so that the package may stand for weeks or even months without losing any of its liquid contents. The milk is not in any way affected, it is stated, either by the bottle itself or the paraffin.

GROUND NUTS AND CASTOR OIL BEANS.—A ready market is now being created in Natal for ground nuts and castor oil beans, by reason of the demand for these products for oil-making purposes. The Durban Oil and Soap Co., Ltd., have addressed a communication to the Department of Agriculture asking whether ground nuts and castor oil beans are obtainable in this Colony in sufficient quantities for oil-making purposes. They state that they would require at least from 200 to 300 tons annually. Farmers interested should place themselves in communication with the Oil and Soap Co., Ltd., as it may be found feasible to greatly extend the acreages at present under these crops, and thus provide a fresh source of revenue for the farm.

MOVEMENT OF CATTLE IN INANDA DIVISION.—The Minister of Agriculture has given permission for the movement of cattle within a certain portion of the Magisterial Division of Inanda upon written authority being first obtained from the local District Veterinary Surgeon, Stock Inspector, or a member of the District East Coast Fever Committee, and subject to any directions or limitations which may be imposed in the permission given. In all cases the route by which the cattle may travel is to be described in the permit given. The following is the portion of the Division referred to:—From a point about midway between the Umhloti and Tongaat Rivers on the sea shore, thence along the Northern boundaries of Lots 7, 8, and 8a of the Cotton Lands, thence along the Southern borders of the farms Klipfontein, Lot 2 of the farm Buffels Kloof and Frosterly, and from the South-western beacon of the farm Roodekranz (Redcliff), on the Ndwedwe Location boundary, thence along the Ndwedwe Location border to the Umgeni River, and down the Umgeni River to the sea.

FOOD-VALUE OF FRUIT.—In an article on the food value of tropical fruits in the *Hawaiian Forester and Agriculturist*, Dr. E. C. Shorey shows that, in addition to being agreeable accompaniments to staple foods, analysis reveals the fact that fruits have some food value of their own. They contain, that is to say, more or less digestive proteids, carbohydrates, or fats. But fresh fruits consist usually in great part of water, which forms nearly 90 per cent. of oranges and pineapples, and more than 75 per cent. of many other tropical fruits. Fruits have a very small amount of proteid, nitrogenous or meaty matter, and so fail of being complete foods. Thus bananas contain 1·3 per cent., avocados 1·0, oranges 0·8, and pineapples only 0·4 per cent. of this important ingredient. The chief food value of ordinary fruits lies in the carbohydrates (chiefly sugars) which they contain. Of these, bananas have 21 per cent, mangoes 15, oranges 11, and pineapples 8, on the average. Few fruits contain fats, the avocado excepted.

RUSSIAN WOOL PRODUCTION.—From a report of H.M. Consul at St. Petersburg (Hon. W. G. Thesiger), it appears that the total quantity of wool put on the Russian market in 1906 amounted to 28,081 tons, coming principally from the districts of the South Don and Caucasus. Deducting therefrom the remnant of the 1905 crop, the quantity of wool produced in 1906 was 25,194 tons, as compared with 31,806 tons in the preceding year. This decrease in the production is ascribed to various causes. On the other hand, a great demand for wool by textile manufacturers is stated to have existed, and this demand is expected to rise still more in the future. This increased demand is partly owing to the development which is taking place in the manufacture of woollen materials resembling furs, such as seal-skins, astracan, etc. For the latter purpose wool of the highest quality is required; and in view of this an increase in the importation of foreign wool is expected to take place during the approaching season.

JUDGING AT SHOWS.—Readers of the *Journal* will remember the discussion and correspondence that took place some three or four years ago in these pages on the subject of judging at agricultural shows. In a series of articles attention was drawn to some of the unsatisfactory features of the judging; and eventually, about the beginning of 1904, it will be remembered, the Natal Agricultural Societies' Judges Association was formed, with Mr. D. C. Dick as president. Readers will be interested to know that the movement has spread to the Orange River Colony, where—at Bloemfontein—the first Conference ever held in that Colony of Live Stock Judges was held during July, under the presidency of the Director of Agriculture (Mr. W. J. Palmer). A comprehensive agenda paper was laid before the Conference, and draft regulations were discussed. In the course of the address with which he opened proceedings, the Chairman explained that it was to reach a common understanding in the matter of uniformity in rules and regulations governing agricultural shows and of a proper system of judging—which, he said, was badly needed at the present juncture—that he had asked permission of Government to invite a few representative breeders, together with the Secretaries of the District Shows, to meet in Bloemfontein. On the motion of Mr. Schimpers it was unanimously agreed "That a Judges' Association be formed consisting of practical farmers and other expert stock men with the object of suggesting suitable dates for district shows in the O.R.C., and of supplying expert judges for such shows when held, this Association to work in conjunction with the Department of Agriculture until a proper Agricultural Union has been formed." Members of the Association would be required to pay an annual subscription of £1 1s.; and on the occasion of their visiting shows they would get their out-of-pocket expenses from the district in which the show was held.

A Report on Natal Teas.—An interesting report is furnished by the tea expert of *Tropical Life* to his journal on the samples of Natal teas shown at the South African Products Exhibition. Thinking that a comparison of the product with that of India and Ceylon might prove of interest he paid a visit to the Exhibition and drew tasting samples from the exhibits there. He obtained specimens from three estates, and was much struck by "the marked improvement" which has taken place in the make of the leaf since he last saw teas from this Colony: "indeed," he says, "they now bear favourable comparison in this respect with other British growths. One of the estates, especially, he remarks, merits commendation, for the leaf is of good size and tip, well made and finished, showing signs of great care in manufacture. "It is when coming to the liquors that one finds cause for disappointment," he continues. "The 'infused leaf' in all cases is too uneven in colour, brown mixed with green and occasionally blackish leaves, evidence of imperfect fermentation, leaving the liquors either too thin, as with Barnesdale teas, or too soft and flavourless, as with those from the other two estates. The Barnesdales were pale yellowish in cup, with a flavour similar to China moyunes, but which might be prejudicial to their sale on the London market. Were it not for this peculiarity they would be very similar in style and quality to some of the best that come from Nilgiri, in Southern India. The defects are such as can be easily remedied, and planters in the Colony are to be heartily congratulated on the success which is attending their efforts to improve the character of their output. Should the time ever come when the industry is sufficiently extended to allow Natal to export part of her crop, the teas will receive in London the consideration they deserve." Mr. Sim, in his report on Natal tea, says: "This came as a surprise alike to Mincing Lane men and to the public. They had not previously heard of Natal tea, and were exceedingly surprised at the quantity produced, and at the progress the industry is making. And though, as critics, they naturally felt themselves bound to express criticism on the product submitted, and to point out rather its faults and shortcomings than its perfection, they all admitted that the product was inherently first-rate, but that the treatment accorded was not quite that to which London was accustomed. Further, they appeared to agree with so many degrees of classification as were represented from Natal it would be useless to attempt bringing Natal tea before the public under that name unless many thousand tons of each grade were available, its present use being rather for blending with other teas so as to produce a uniform quality maintainable in quantity at all times. This then involves selling bulk into the hands of blenders rather than the establishment of agencies at which the maintenance of an adequate supply of any brand would be a difficult matter at present."

Tobacco Cultivation in South Africa.

WITH SPECIAL REFERENCE TO NATAL.

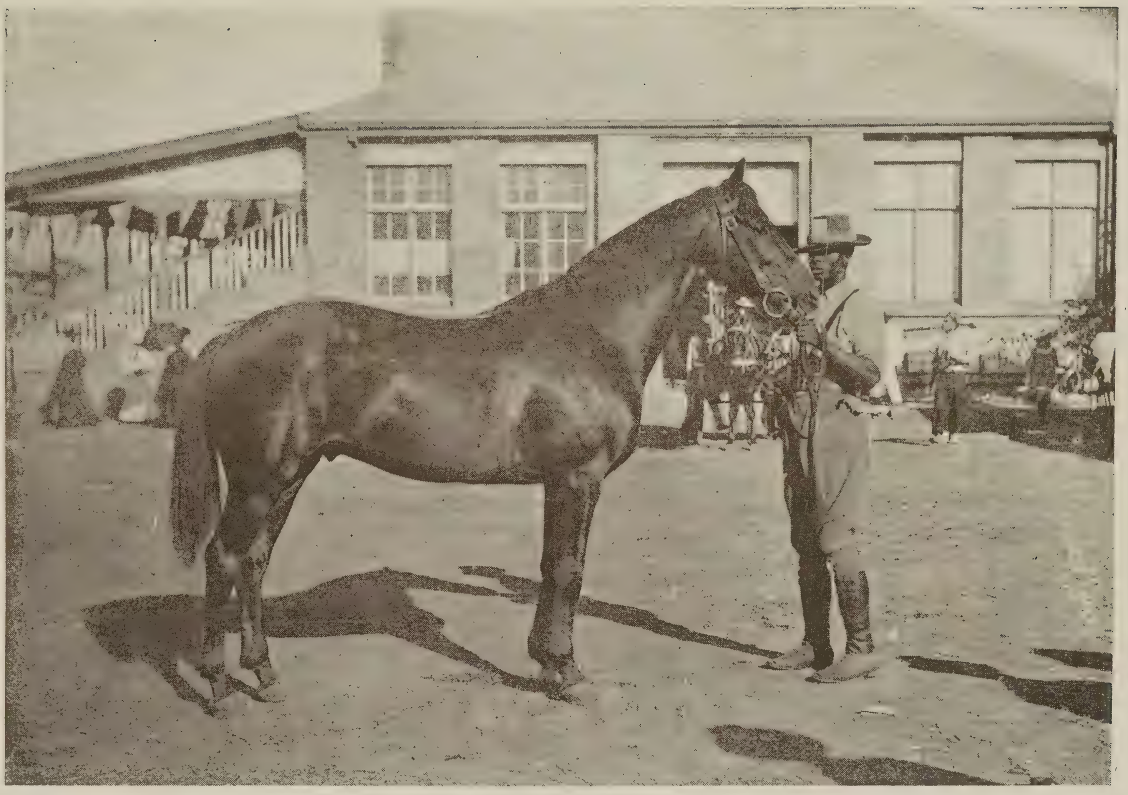
By E. R. Sawer, Director Experiment Stations.

II.

All types of tobacco are highly susceptible to changes of locality, and if several imported varieties be grown for a number of years from locally-saved seed, they will ultimately assume common characteristics derived from soil and climate, and lose their original distinctive features. The results of such a process may be seen in the so-called Natal leaf, which is the product of several distinct cigar tobaccos, and an example of the degeneration which may take place within a few years. It is advisable to frequently import from the locality where the particular tobacco reaches its highest excellence, and thus secure the qualities for which it may be famous. Such a system is now in vogue in all the older tobacco-growing countries, and a world-wide trade is being done in Cuban seed from the district of Vuella Abajo. In pursuance of this policy, supplies, as detailed below, have been secured for distribution to planters at cost price, and, it is hoped, a first obstacle to progress thereby removed. Tobacco is classified according to its employment, which may be as cigar filler or wrapper, cigarette-leaf, for pipe, plug, chewing, etc., and within each class a larger or smaller number of varieties is to be found, cultivated for the specific purpose in different localities. From these a small list has been compiled, based upon the experience of planters in the different Colonies of South Africa, though further modification will in all probability be necessary before definite selection can be made of standard types for Natal.

SELECTION OF VARIETIES.

Success in tobacco-planting must largely depend upon the careful consideration of climate, soils and markets, after which it remains for the grower to make trial of such types as have proved to be the best in similar conditions elsewhere. In general, greater heat is necessary for the production of aromatic tobaccos which are suitable for cigar fillers. The bulk of the world's supply of pipe and cigarette leaf is grown in the warmer portions of the temperate zone, while the cooler portions of this area give rise to their leaves with little aroma, but suitable for cigar wrappers. The lightest soils favour the growth of cigarette and bright pipe-leaf, heavier soils are sought for mahogany pipe-leaf and



ROYAL AGRICULTURAL SHOW.

First Prize Stallion (Class I.): "Bedouin," Chestnut. Exhibited by Mr. B. Johnstone, Volksrust.

chewing tobaccos, while the richest obtainable sandy loams are desirable for the production of cigar-fillers. In all cases, however, an excess of clay is to be avoided. The following classification and brief descriptions may afford some assistance in the matter of selection:—

Cigar Tobaccos.

Cuban.
Zimmer Spanish.
Sumatra.
Connecticut.
Havana.
Brazilian.

Cigarette Tobaccos.

Turkish (Aromatic, Cavalla, Smyrna, Samsam, Bafra).
Bright Virginian—Yellow Orinoko.

Light Pipe Leaf (for flue-curing).

Hester.
Goldfinder.
Conqueror.
Warne.
Bullion.

Mahogany Pipe Leaf (for air-curing).

Honduras.
Burley.
Medley Pryor.

Cuban.—Yields a small leaf, but if grown from imported seed retains much of the aroma of Cuba-grown tobacco. It is used for high-class cigars, both as fillers and wrappers.

Zimmer Spanish.—Yields a medium-sized leaf of dark colour and high flavour. Used for ordinary cigars as filler, and gives a heavy yield per acre.

Sumatra.—Yields a very thin leaf, of fine texture with small veins. Should be grown for cigar--wrapper, under cover of calico or laths if possible.

Connecticut.—Yields a very broad, fine leaf, strong, silky and elastic with small fibres; suitable for wrapper or filler.

Havana.—Very thin, fine leaf of delicate flavour. Used for wrapper and filler.

Brazilian.—Yields a coarser, heavier leaf than the above. Used for cheaper cigars, or for blending with better grades.

Turkish.—A very distinct type of tobacco, probably derived from South America. In Turkey is generally sun-cured, but in South Africa has also been successfully flue-cured.

Bright Virginian.—Grown in a variety of types. Leaves light-coloured and of delicate flavour. When flue-cured tobacco ranges in colour from a lemon-yellow to light mahogany.

Hester.—Yields a broad, heart-shaped leaf, fine-fibred and silky. Gives to flue-curing a very bright, yellow or mahogany pipe-tobacco.

Goldfinder.—A similar bright tobacco to the above, for growth on sandy soils.

Warne.—A very popular variety for the production of yellow, flue-cured tobacco.

Bullion.—A White Burley cross on Hester. Broad-leaved and of fine texture. Yields a slightly heavier, yellow to mahogany pipe-leaf to flue-curing.

Honduras.—A vigorous plant, and one of the best for mahogany pipe-leaf of medium strength.

Burley.—Yields a long, narrow leaf, which is white in appearance while growing. Suitable for rich, limestone soils, and the production of a heavy crop of full-flavoured pipe-leaf.

Medley Pryor.—Yields a very broad, soft, silky leaf with tough fibre. Should be grown on rich, heavy soils for the production of dark, full-flavoured pipe-tobacco.

PREPARATION OF THE SEED BED.

A majority of the failures in tobacco-planting originate in the seed-bed, and a careful study should be made of the dangers to which the seedlings are subject. Germination is somewhat protracted, and it is frequently a month or even six weeks before the plants appear above ground. This feature is of importance in view of the fact that even the most careful hand-weeding disturbs the tobacco roots and unduly weakens the plants. Every effort must therefore be made to secure a bed which is at the outset free from weed-seeds. This should be prepared as early as possible in winter, choice being made of a rich sandy loam in a sheltered position. After marking off the bed, which should not exceed four feet in width, brushwood and timber should be piled on the surface in sufficient quantity to maintain a strong fire for at least an hour. This will destroy both seeds and any insect eggs which may be present, and furnish a valuable fertilizer to the plants. While the ashes are still warm, the bed should be thoroughly dug over to as great a depth as possible, and raked to a very fine surface. All rubbish which might hinder the growth of the plants or their subsequent removal must be carefully removed, and the soil brought to a high state of pulverisation. The seed should then be mixed with 100 times its weight of fine ashes, or fine, dry earth, and sown at the rate of one ounce to a hundred square yards of seed-bed. If carefully handled a thimbleful of seed of the pipe-leaf varieties will suffice to plant an acre of tobacco, though ten times as many plants are required to cover an equal area with Turkish leaf, for which a closer spacing is adopted. A light roller drawn over the bed will afford ample cover to the seed, which should on no account be deeply buried. The surface should now be moistened with weak manure-water, prepared by mixing 10 lb. of poultry droppings in 12 gallons of water, and lightly covered with straw. A double course of bricks should then be laid round the margin of the bed, upon which are placed hessian or scrim-covered frames for the protection of the seedlings against cold, heat and insect attacks. Too much emphasis cannot be laid upon the need for this precaution. Sowings should be made at intervals of a week to ensure a supply of transplants whenever the weather shall favour their removal to the plantation. It is useless to fix beforehand dates for this operation, as the planter must be ruled by circumstances prevailing at the time. The plants in the seed-bed must always have sufficient moisture and be kept growing vigorously. If the rainfall be insufficient, they should be watered with weak liquid manure as often as is needed. If weeds appear in spite of the above precautions, they must be removed by hand with the utmost care. It will frequently happen that the most careful sowing will result in an overcrowded bed, in which case the plants should be thinned by drawing a rake through them.

(*To be continued.*)

Austria produced, in 1906, 5,089,575 muids of maize, from an area of 847,471 acres. The area under oats was 4,531,063 acres, from which 27,475,814 muids were obtained. The production of barley was 20,273,189 muids, from 2,909,146 acres.

A LARGE SILO.—The largest silo in Australasia is, according to *Dalgety's Review*, one that has just been erected at Mr. F. G. Waley's Mowbray Park Estate, near Picton, New South Wales. It has a capacity of 600 tons, but is built of four separate divisions under one roof. These divisions are 24 feet high, are 24-sided, circular in construction, and are entirely air-proof, having no joints to permit the ingress of air. The walls are ferro-cement, fortified with steel webbing and wrought iron bands to take excess of pressure. The floors are concrete. By placing the silos in a group, all the emptying doors are put under cover, so that when the ensilage is being used a cart can be backed in and the ingredients loaded therein by means of a hopper. The doors are constructed upon the principle of a boiler manhole, with an insertion joint that is squeezed out, and this prevents any leakage of air—a common fault with most doors of tub silos. The silos cost £85 each, which is stated to be about 33 per cent. less than anything permanent in Australia so far.

Vlei Soils.

(*Continued.*)

By Alex. Pardy, F.C.S., Analyst.

The bases found in solution in the water with which the soil was extracted were found to be in combination most largely as chlorides, sulphates, and carbonates. The acids determined were as follows:—

Sample.	Acid.	1st Foot.	2nd Foot.	3rd Foot.
No. 1	Silicilic	·003	·002	·001
	Sulphuric ...	·003	Trace	Trace
	Chlorine ...	·016	·018	·014
	Carbonic ...	·040	·010	·039
No 2	Silicilic	·001	·003	·003
	Sulphuric ..	·004	Trace	·002
	Chlorine ...	·015	·017	·016
	Carbonic ...	·013	·048	·039
No. 3	Silicilic	·003	·004	·003
	Sulphuric ...	·004	·002	·002
	Chlorine ...	·012	·013	·012
	Carbonic ...	·049	·017	·057
No. 4	Silicilic	·002	...	...
	Sulphuric ...	·006	...	...
	Chlorine ...	·012	..	...
	Carbonic ...	·062	...	...
No. 5	Silicilic	·004	·003	...
	Sulphuric ...	·006	·002	...
	Chlorine ...	·013	·016	...
	Carbonic ...	·015	·017	..
No. 6	Silicilic	·004	·005	..
	Sulphuric ...	·015	·017	...
	Chlorine ...	·017	·012	...
	Carbonic ...	·052	·043	...
No. 7	Silicilic	·004	·002	...
	Sulphuric ...	·001	·003	...
	Chlorine ...	·003	·002	...
	Carbonic ...	·020	·040	...

Note.—Carbonic includes free carbon dioxide.

The predominating compounds in solution are those of sodium as chloride, carbonate, and sulphate, but even in the most highly charged soils these do not seem to be present in alarming quantities or in such that their removal could not be effected by drainage. Should irrigation be attempted without due regard to drainage, it is highly probable that an accumulation of the saline matter would take place in the soil to an extent depending on the frequency of the application of the quantities of water so applied and its contents of soluble constituents. With a corresponding system of drainage such disabilities are not likely to arise. Following the extraction of the soil by water, solutions containing mono-calcium phosphate, magnesium sulphate, calcium nitrate, and potassium sulphate in small quantities were passed through the same columns of soil in order to ascertain what amounts of the various constituents were capable of being retained by the soil. The solutions used were of a dilute nature; they contained 1·30, 0·81, 1·80, 1·720, 0·50, and 0·25 parts per 1,000 respectively of lime, magnesia, phosphorous pentoxide, sulphur trioxide, potash, and nitrogen. The filtrate from the soil was collected and the amounts which were passed through were, after determination, deducted from those which were originally placed in contact with the soil, the difference between the two being taken as the amounts held by the soil.

The following table will show the quantities of the various constituents so obtained as being held by the soil. The figures are given in grammes as per 75 grammes soil:—

Sample.	Salts.		1st Foot.	2nd Foot.	3rd Foot.
No. 1 ...	Lime	Passed	·330	·282	·270
		Retained	·320	·368	·380
	Magnesia	Passed	·208	·196	·173
		Retained	·197	·209	·232
	Potash	Passed	·188	·194	·178
		Retained	·062	·056	·072
	Sulphur Trioxide ...	Passed	·750	·753	·735
		Retained	·110	·107	·125
	Phosphorous Pentoxide	Passed	·008	·019	·015
		Retained	·892	·881	·885
	Nitrogen	Passed	·085	·085	·100
		Retained	·042	·042	·027

Sample.	Salts.		1st Foot.	2nd Foot.	3rd Foot.
No. 2 ...	Lime	Passed	·335	·320	·290
		Retained	·315	·330	·360
	Magnesia	Passed	·223	·189	·189
		Retained	·182	·216	·216
	Potash	Passed	·157	·186	·198
		Retained	·093	·061	·052
	Sulphur Trioxide ...	Passed	·725	·730	·778
		Retained	·135	·130	·082
	Phosphorous Pentoxide	Passed	·039	·012	·025
		Retained	·861	·888	·875
	Nitrogen	Passed	·025	·120	·115
		Retained	·102	·007	·012
No. 3 ...	Lime	Passed	·270	·237	·294
		Retained	·380	·413	·356
	Magnesia	Passed	·200	156	·156
		Retained	·205	·249	·249
	Potash	Passed	·154	·227	·197
		Retained	·095	·023	·053
	Sulphur Trioxide ...	Passed	·752	·751	·783
		Retained	·108	·109	·077
	Phosphorous Pentoxide	Passed	·015	·076	·068
		Retained	·885	·824	·832
	Nitrogen	Passed	·061	·075	·074
		Retained	·066	·052	·053
No. 4 ...	Lime	Passed	·209	...	...
		Retained	·441	...	...
	Magnesia	Passed	·195	...	...
		Retained	·210	...	...
	Potash	Passed	·207	...	...
		Retained	·043	...	...
	Sulphur Trioxide ...	Passed	·726	...	...
		Retained	·134	...	...
	Phosphorous Pentoxide	Passed	·055	...	...
		Retained	·845	...	...
	Nitrogen	Passed	·100	...	...
		Retained	·027	...	...

Sample.	Salts.		1st Foot.	2nd Foot.	3rd Foot.
No 5 ...	Lime	Passed	·244	·218	...
		Retained	·406	·432	...
	Magnesia	Passed	·190	·188	...
		Retained	·215	·217	...
	Potash	Passed	·166	·180	...
		Retained	·084	·070	...
	Sulphur Trioxide	Passed	·782	·748	...
		Retained	·078	·112	...
	Phosphorous Pentoxide	Passed	·140	·115	...
		Retained	·760	·785	...
	Nitrogen	Passed	·070	·110	...
		Retained	·057	·017	...
No. 6 ...	Lime	Passed	·155	...	...
		Retained	·495	...	...
	Magnesia	Passed	·105	...	...
		Retained	·300	...	...
	Potash	Passed	·238	...	...
		Retained	·012	...	...
	Sulphur Trioxide	Passed	·811	...	...
		Retained	·055	...	...
	Phosphorous Pentoxide	Passed	·125	...	...
		Retained	·775	...	...
	Nitrogen	Passed	·108	·110	...
		Retained	·019	·017	...
No 7 ...	Lime	Passed	·168	·250	...
		Retained	·482	·400	...
	Magnesia	Passed	·176	·230	...
		Retained	·229	·175	...
	Potash	Passed	·203	·184	...
		Retained	·047	·066	...
	Sulphur Trioxide	Passed	·795	·851	...
		Retained	·065	·009	...
	Phosphorous Pentoxide	Passed	·092	·100	...
		Retained	·808	·800	...
	Nitrogen	Passed	·112	·109	...
		Retained	·015	·018	...

The soils vary individually in the amounts of the constituents retained, but they agree in their behaviour towards the various salts. It will be observed, for instance, that, if the average amounts of these constituents are separately considered, there is a decided preference shown for some over others, and each soil displays this characteristic to a greater or lesser degree. Taking the average percentages of each constituent retained, we have the following relative order clearly defined, viz.:—

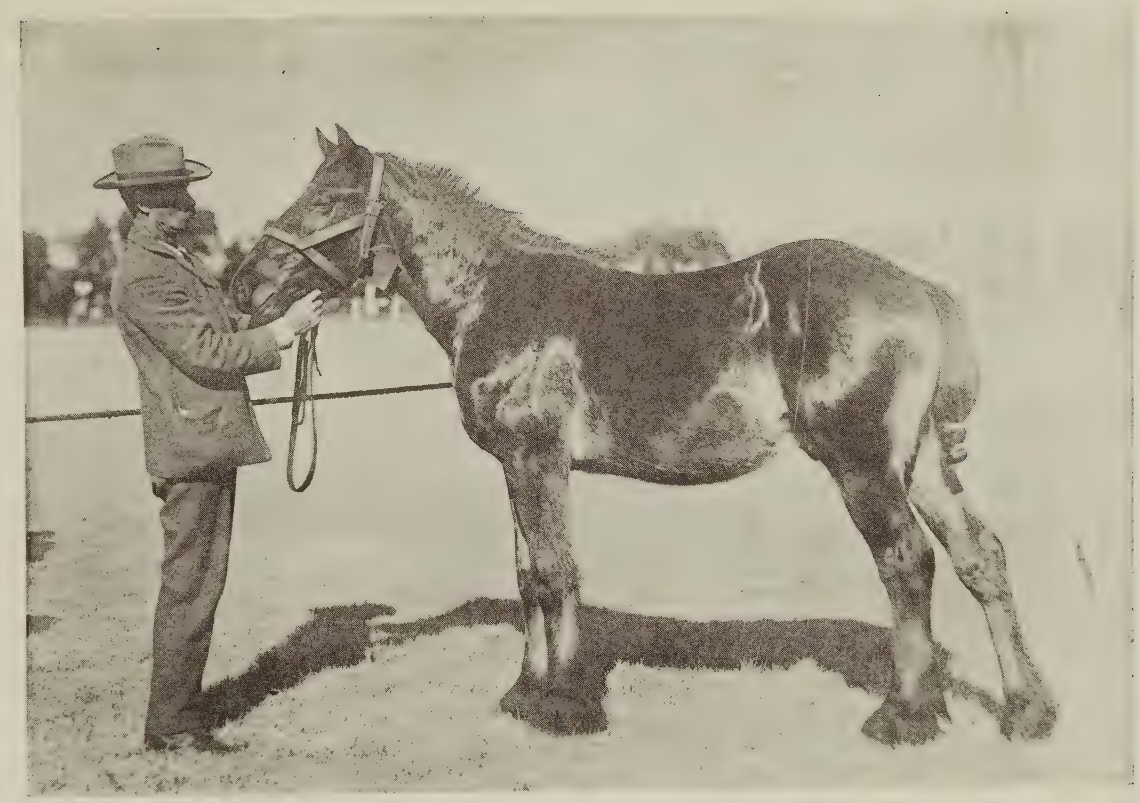
Phosphorous pentoxide	92·5	per cent.	retained.
Lime	60·1	,,	,,
Magnesia	55·8	,,	,,
Potash	24·0	,,	,,
Nitrogen	23·6	,,	,,
Sulphur trioxide	11·7	,,	,,

These proportions of the various ingredients were taken from the solutions by the soil whilst passing through it. All the constituents were in a water-soluble form, so that under the same conditions it is apparent that the soil has a greater power of retaining some compounds than others. Under the natural conditions occurring in the field, this would probably hold good under modifications induced by the various agencies pertaining to the soil, but the fact that the soil possesses this power in a varying measure is of importance in connection with the application of soluble manures.

It will be observed that the great bulk of the phosphoric acid, although soluble in water, is firmly held by the soil; and that the nitrates pass out very readily.

(*To be continued.*)

Export of Ostriches from O.R.C.—A recent issue of the *Government Gazette* of the Orange River Colony contains the text of a draft Ordinance for the imposition of a duty on the export of ostriches and ostrich eggs. It is proposed to levy a duty of £100 upon every ostrich and of £5 upon every ostrich egg exported from the Orange River Colony, provided, however, that no duty shall be payable on exports to any neighbouring State or Colony where similar legislation is in force. The penalty for the contravention of the Ordinance is to be a fine of not less than £25 and not more than £100 for each ostrich or egg exported contrary to the provisions of the law.



ROYAL AGRICULTURAL SHOW.

First Prize Bay Yearling : Bred and exhibited by Mr. Thos. Keel, Umlaas Road.

Man's Influence on Climate.

A PAPER READ BEFORE THE SOUTH AFRICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

By T. R. Sim, F.L.S., Conservator of Forests.

At first glance climate seems so far beyond human influence that probably few have ever taken into consideration how much good or harm they are unconsciously producing, or at least have the power to produce, in respect to it.

But a closer inspection shows that man actually has an influence—usually unrecognised even by himself, but still active and effective—upon the climate of his neighbourhood. This influence is produced in several different ways, and is sometimes quite local, but at other times more widespread, and at least contributory, along with other causes, to climatic changes of the first magnitude, and affecting whole continents.

Among local influences may be mentioned the following:—

(1) *A local climatic change is effected by the production of shelter.*—Everyone knows that the erection of a stone wall, or the growth of a hedge or plantation, will alter the climatic conditions in the area sheltered thereby. This sheltered area may be very limited, but the practice is in common use in horticulture for the production of fruit and vegetable crops too tender to succeed without such artificial protection. It is also in common use in agriculture for the production of sheltered corners where stock can be comfortable during severe weather. This is simply the artificial extension on a small scale of the shelter of mountains and ridges by which nature on a larger scale provides for variations of climate affecting whole districts, but because more directly under control, and more local in its scope, is often more noticeably effective.

(2) *A local climatic change is effected by drainage.*—Farmers know to what an extent amelioration is produced through effective drainage of farm land, and though most farmers are inclined to attribute this, and to some extent correctly so, to the improved hygroscopic condition of the soil, it is also the case that the drier soil is warmer and more responsive, and that the surrounding atmosphere is similarly affected thereby. Land which formerly was liable to frequent and severe frosts may, if suitably located, be altogether free from frost after effective drainage, and, on the other hand, land which when dry has been frost-free, is liable to suffer from frost when artificially placed in a condition of saturation.

Drainage of large malaria swamp districts has been credited with improving the climate to the extent of doing away with malaria, and the extensive planting of Eucalypts and other rapid-growing trees (which in itself is an effective form of drainage) has been similarly credited, and there can be no doubt but that an enormous climatic benefit has usually accrued, though the expulsion of malaria is a secondary and often misunderstood benefit arising rather from the production of conditions inimical to the malaria-carrying mosquito, than from actual destruction or non-production of miasma.

(3) *A local atmospheric change is produced in towns, and in the neighbourhood of factories, foundaries, mines, etc., by the emission into the atmosphere of smoke in sufficient quantity to produce haze or fog, or of gases having a deleterious effect on vegetable as well as animal life.*—Smoke is sometimes produced intentionally in horticulture on purpose to form a "smudge" sufficiently dense to prevent frost and to delay or render gradual the effect of bright sunshine after frost has actually occurred.

All the above are climatic changes produced by man, easily noticed, and more or less local in their effects.

But there are other changes taking place which are more gradual, less noticeable, but none the less important, brought about by the effect of vegetation on its surrounding atmosphere; and man's influence in maintaining or destroying this vegetation is the prime mover in the matter. "Forests precede a population and deserts follow it," has unfortunately been the case almost everywhere, and the difference between forest and desert in the relation of each to the atmosphere is immense.

There is a popular idea that forests produce rain, which, however, requires qualification. That some classes of forest do act in this way is quite true, but in other cases this is not so evident. The result in all cases is the effect of a natural law under which at a high temperature the atmosphere can carry a larger amount of moisture than it can at a low temperature. Consequently, when a warm air-current passing over the sea landward absorbs from the sea its full proportion of moisture, and afterwards comes in contact with a colder surface or a colder air-current, it is no longer able to maintain the moisture it contains, and precipitation as rain follows. A warm moisture-laden cloud striking against a cold mountain or cool forest has its own temperature reduced thereby, and gives off part of its moisture as rain, mist or dew. But in this the nature of the surface it strikes has some effect. A bare sandy soil is by day warm and dry, and so not only draws no moisture from the cloud but actually repels rain so long as it is warm enough to add heat to the atmosphere above it. On the other hand, a cold solid mountain mass produces a sudden chill on a warm cloud, and the result is the heavy showers so common in mountain districts.

But forests have a further effect. Besides being usually located on the shady and cool side of a cold mountain, the natural tendency where there is a mass of foliage overhead and a more or less open space below is to produce under this canopy a considerable mass of an atmosphere much colder and more permanently cold than that existing where the canopy is absent. This coldness is further augmented where the humus produced by decaying leaves forms a deep hygroscopic mass in which every drop of rain that falls is retained instead of running off at once into some stream. Everyone knows the chilly, damp atmosphere usually found inside a forest, and which naturally spreads more or less for some distance around and above the forest. A warm moisture-laden cloud coming in contact with such an atmosphere is reduced in temperature and consequently yields part of its moisture as rain, while even cold clouds usually find the forest atmosphere colder than themselves, and consequently continue to lose moisture by precipitation as dew, or show it as mist, long after more open country shows no effect. It will be noticed that cloud and mist are only produced when the local temperature falls low enough to render the moisture present in the air visible, without actually falling, hence the constant variation in the form of cloud with every fresh contact with warmer or colder air; hence also the mist in a valley during or after frost, and the mist on a mountain-top while all is clear below. Immediately after precipitation ceases and the warm atmosphere is again able to maintain what moisture remains in it, a return action commences by which the warmer cloud draws from the moist atmosphere below, and from the ground, moisture up to its full carrying capacity, and thereby a condition of saturation and of visible cloud is maintained in and about the forests more than elsewhere.

Man's action therefore in maintaining and in producing forests of a satisfactory class has a beneficial climatic effect where, as in South Africa, more moisture is desired, while in localities like Siberia, Russia, Scandinavia, and Canada, where the proportion of forest is naturally high and the temperature low, an improvement in climate can be effected rather by the removal of part of the existing forest.

Where removal goes on to the extent of thinning out a large amount of forest, leaving open gaps or glades, insolation goes on almost as in the open; canopy is practically absent; the cool moist forest atmosphere also disappears, and the cooling effect upon rain clouds is only that produced by the coolness of the actual foliage. Countries then which, like some of the American States, have been felling timber for many decades, at a rate faster than regrowth grows, naturally affect the local climatic conditions; slowly, it is true, but none the less surely. And when State after State continues this operation, or carries it out simultaneously, the result is all the more widespread, and all the more likely to affect adjoining districts.

And when in localities, as in South Africa, where the total forest area is small, part is thinned out in this way without such protection being afforded as allows a dense regrowth to follod, the result naturally is that the former forest atmosphere dries out, the surface herbage becomes parched, and a forest fire sooner or later finds its way in, and destroys the remaining vestiges of forest growth. And where trees are naturally sparse and xerophytic, as in South African thorn scrubs, evolution gradually produces in them an ability to withstand drought or even fire, or to suffer less from it, while undergrowth is annually burned clean off. In such case the effect upon the atmosphere is only what is produced by the foliage itself, and usually that foliage is of the small and gradually disappearing nature characteristic of such localities.

But to return again to heavy forest, and especially in regard to afforestation in South Africa, it is noted that the effect of cover is more pronounced under trees which form heavy canopy and produce much humus than under trees of lighter canopy, or where humus is scarce. This accounts to some extent for the remark already made that in regard to some kinds the statement that forests produce rain requires qualification, for the trees of light canopy and small humus are usually the Australian Eucalypts and Acacias, trees which often have their leaves or phyllodes more or less vertical, and consequently of slight protection against insolation, and whose leaves do not readily decay and consequently form poor humus. But, along with this, these trees are of exceedingly rapid growth, and transpire the enormous amount of moisture necessary to allow the fixture of the carbon forming leaves and stem. To do so they must draw it from the soil, and it is found, in actual practice, that, though these trees do cause a considerable amount of precipitation, their powers of transpiration and evaporation are even greater, and that they actually pass off more moisture than they draw. To keep that up a natural water-supply in the ground is required, and it is taking advantage of this fact that has led to the use of certain trees for the purpose of drying swamps. They actually draw the moisture from the ground into the atmosphere and sometimes form a valuable natural drainage where absence of fall prevents artificial drainage being adopted.

The moral of all this is that in South Africa wherever forest is formed or maintained in a sufficiently dense condition and of kinds not too absorbtive of moisture, but still sufficiently humus-producing, then the result in regard to the local climate is a reduction of temperature and an increased amount of rainfall or other precipitation, with a slight tendency for these results to be felt to some extent in the surrounding district. On the contrary, where the density of a forest is not maintained, or where the kinds used require more moisture than they attract, gradual dying out may be expected, or the gradual evolution of the trees into more xerophytic forms, or the gradual substitution of such forms instead of the broader-leaved kinds, while the overhanging atmosphere gets gradually drier and drier. All this is a matter more or less under man's control, but it does not end here.

The effect produced by the canopy and humus of trees in dense forest is also produced, though in a lesser degree, by the close vegetation and natural decay of good grass-veld.

That "every blade of grass has its own drop of dew" is absolutely true wherever moisture-laden atmosphere comes in contact with foliage colder than itself; and where there is a dense green sward with a moist undermulch of decayed foliage, the herbage is cooler than the atmosphere during night, with the result that an immense precipitation takes place. The beneficial effect of this dew has always been recognised, but its volume is often under-estimated, especially that from driving mist, which has been shown by Dr. Marloth to measure 80 inches in two months during the rainless summer, on the top of Table Mountain, when collected by rushes standing out of the rain-gauge, as against five inches in the same period collected in an ordinary rain-gauge alongside.

Such a precipitation, collected by the foliage and retained by the humus has an immense effect on the local climate as compared with what happens when the grass is all burned off annually, the humus destroyed by fire, and the moisture-attraction completely destroyed. And this contrast is the more marked when after many years of veld-burning, and that occasionally out of season, the good grass gradually disappears and there grow instead scattered tufts of weeds, wire-grass, or karroo-bush, separated by wide stretches of bare surface, usually washed clear of soil or hardened almost like rock. No attraction for moisture exists there, heat is reflected by day and radiated by night, and the consequence is an atmosphere rendered all the more fit, by increased temperature, to carry all the moisture it may contain.

Now, just as the moist forest atmosphere has a tendency to affect its immediate surroundings, so also have dry carroid conditions a tendency to spread, through the hot atmosphere being able to carry its moisture further and further away, while at the same time the absence of vegetation on the carroid area renders the pasture demand on the land around it all the greater if the small amount of stock and game in the neighbourhood is to continue to subsist there. The amount of travelling to and fro in search of water and in search of food also tells considerably on what vegetation remains, and tends to further denude and consolidate the intervening surface.

Now, throughout Africa the amount of nearly bare karroo is enormous, and its proportion to the whole area is so great, while that of forest and even of good grass-veld is so small, that the total tendency is toward an extension of karroo and a diminution of forest. This is meantime the natural course of events, and has been so for a long time. It is on record that Egypt was fairly well watered and comparatively green until the introduction of the camel led to the browsing off of the tops of the trees and bushes, and brought them to a size at which goats could easily complete the work of destruction.

So also in the adjoining Arabia and Persia, and a huge area transformed by the consequences of such small beginnings from a fertile condition into an arid desert forms now a drought-centre from which desiccation continues to spread.

So also in South Africa, the grazing of the karroo, the burning of the grass-veld, and the tramping of stock to and from water, have effected and are still effecting changes in the veld and in the atmosphere, which can only end in universal desert, unless means are taken to prevent this.

Moffat noticed the gradually increasing drought as it affected the Kuruman and other streams of his district which have now become totally dry river-beds; Livingstone noticed a similar action already going on in the Lake district of Central Africa; Brown noticed it in regard to Lake Ngami and elsewhere; and any farmer of many years experience in the districts adjoining the South African karroo can relate how the vegetation has altered within his time from a fairly good grass-veld into a condition of more or less decided karroo. This I have witnessed personally within the past 20 years in districts of Aliwal North, Burghersdorp, Wodehouse, Barkly East, Steynsburg, Tarkastad, Queenstown, Cathcart, Stutterheim, Kingwilliamstown, Peddie and East London, in all of which the gradual transition in its various stages has been painfully manifest. The rush swamps which used to be so common in the upper portions of these districts have altogether disappeared, tall waving rooi-grass has given place to dwarf quacucouch, this has been replaced by karroo-bush or small weeds; enormous erosion has taken place in some places through absence of roots to hold the surface, and the accumulation of salts in the flatter parts of the valleys has produced sterility through brackness, while the increasing dryness has rendered the forests retrogressive rather than aggressive, and this effect has been accentuated by the grass fires annually encroaching into the forest margin, and occasionally breaking through and doing damage inside.

In all this there can be no question but that man has in his power, at least to a considerable extent, the control of the climate.

It is, however, no longer a local matter influenced by the action of any one individual, but a public question, requiring co-operative action which best takes the form of Government control, on purpose to check the progress of such widespread disaster as threatens sooner or later to overtake the whole of Africa, as it has already claimed much of the karroo in the south and of the Sahara in the north, as well as Egypt, Arabia, and Persia.

It may be asked in what way can man improve matters. The destruction is evident and increasing, but what can be done to stop it without interfering with the present utilisation of the land?

Much, and in many ways.

The culture of crops supplying winter-feed allows what is considered a summer stock of cattle to be maintained all the year round without inflicting hardship either on the veld or on the stock. The disuse of grass-burning and its substitution by paddocks grazed in rotation but never injuriously grazed, does much to maintain or improve the climatic condition instead of allowing it to drift; while feeding stock by manure-grown crops upon such paddocks gives them a manurial improvement so long as the grazing is in moderation and beef or wool the only crops removed.

I am aware that popular prejudice is in favour of grass-burning and to some extent against the culture of winter-feed, but that is only in relation to the pastoral agriculture which is now rapidly giving place in most localities to more intensive farming, which latter requires the adoption of methods specially fitted for its use, and the abolition of such methods as no longer fit the altered practice. Veld-burning has its use in some circumstances, but its habitual use as a yearly practice must give way, if only as a public precaution against the more rapid spread of that desiccation which already has its grip all too firmly on South Africa.

The production of abundant foliage, by whatever means, has a tendency in the right direction, so long as the soil is able to maintain that foliage, and in this respect cultivation plays an important part. Frequent and deep cultivation produces and maintains foliage better than an annual shallow culture, and so also frequent surface scuffling maintains an open soil-surface which attracts and retains moisture from the atmosphere much better than a hard surface or a bad veld does.

Intensive farming is to be commended then in this respect, even apart from its profitable nature and its economic advantages.

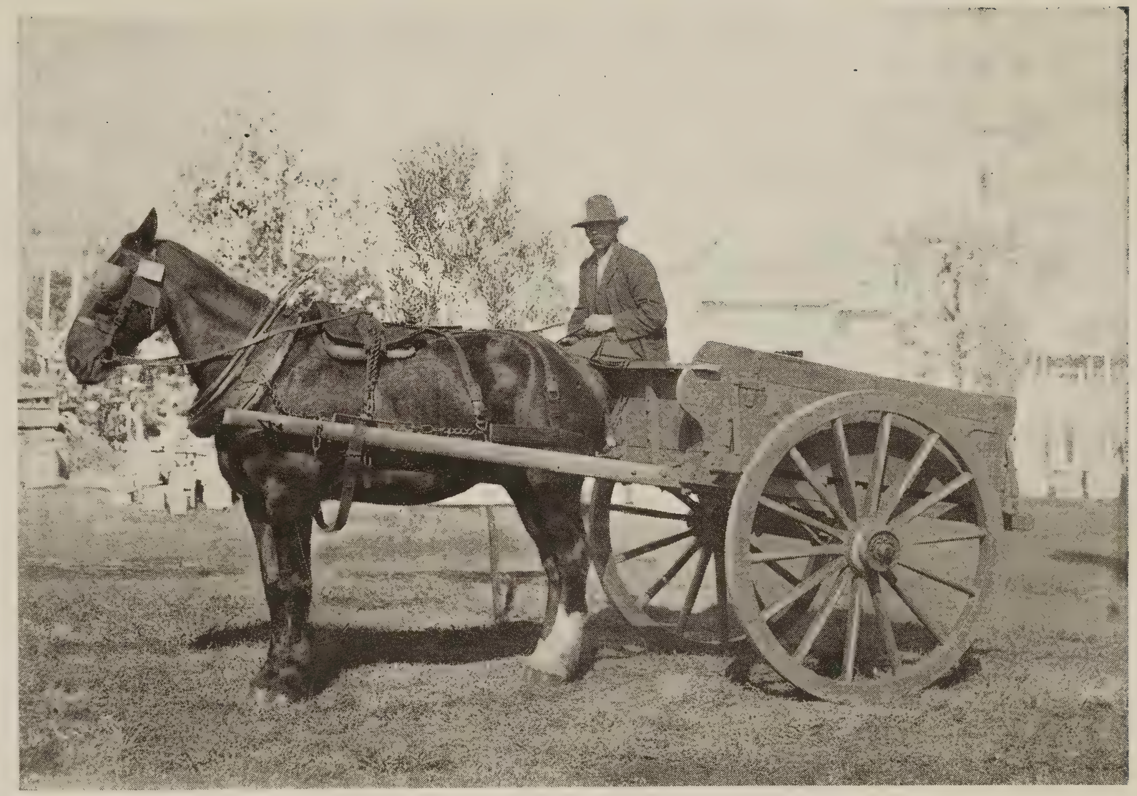
But it is more particularly in the extension—the enormous extension—of plantations of moisture-attracting trees that climatic improvement is assured, or at least that a check can be put upon the rapid desiccation now going on. In Europe 25 per cent. of the total area is considered a fair proportion under forest in order to secure suitable climatic conditions. In South Africa, with its higher temperature and lower average rainfall, even a larger proportion is necessary, while the actual area under forest of all kinds is much less than one per cent.

Even much of the existent plantation forests are of kinds of doubtful advantage in this respect, their rapid growth causing more moisture to be used than is attracted by them. But even there an advantage is gained in this, that winds dried out by contact with such plantations naturally become warmer and lighter by the loss of their moisture and rise, leaving their places to be filled by further moisture-laden clouds from the sea, and thus a constant pumping arrangement from the sea on to the land is automatically produced.

This same kind of action secures that, wherever there is forest fit to draw moisture from a cloud, a further supply of moisture-laden atmosphere rushes in from seaward and keeps up the supply, or even passes onward to the next point of attraction; so that the forest, instead of exhausting the atmosphere of its moisture, rather aids in keeping up an increasing supply.

As already mentioned, the kind of tree used for plantation work materially affects the result from a climatic point of view, and in this the quick-growing and consequently rapidly remunerative kinds are the least beneficial. Slow-growing species, producing dense canopy and humus, are the most useful climatically, and since these are so long in bringing in returns that the private planter omits them from his plantation, there is the more reason why the various Governments should act energetically in forming large plantations of these kinds. Want of funds is the common excuse, but the Cape Colony has set a good example in carrying on this work from loan funds on the principle that it is expenditure which will ultimately be remunerative. Of that there cannot be any doubt if the work is skilfully and economically performed, even apart from the question of climate, but the climatic importance is so great as to practically outweigh all other considerations and warrant even huge expenditure. The drying out of South Africa is at present going ahead at an enormous and rapidly increasing pace, much accelerated by the methods of pastoral agriculture in use; cattle diseases have rendered that form of industry unremunerative or doubtfully and irregularly remunerative. Intensive culture and rotation grazing are steps towards production without prejudicial effect on the climate, but it is in plantation work, and especially Government plantation works of slow-growing and humus-producing kinds of trees, that any safety or even precaution against increasing desiccation lies.

A SOUTH AFRICAN COMMERCIAL AGENCY.—*Reuter* announces the formation in London of "a power organisation" to advance South African interests. Sir Pieter Bam is Chairman of the new organisation, which will maintain the Exhibition Committees and assist the South African Governments to form a Commercial Agency to push South African products in Great Britain and British goods in South Africa. Facilities will also be obtained for South Africans to inspect British farms and manufacturing centres. Special attention is to be given to young Dutchmen visiting England, and to induce people with capital to take up agriculture in South Africa. Offices will be established in London and Capetown. For the purposes of the formation and carrying on of the organisation, it is stated in the cable that already Mr. George MacLachlan, of Glasgow, has given £500 per annum and Sir Richard Cooper and others £100 per annum for seven years.



ROYAL AGRICULTURAL SHOW.

First Prize Cart Horse, in Harness. Exhibited by Pietermaritzburg Corporation.

Parliamentary Notes and Notions.

By "SCRUTATOR."

Maritzburg, 20th July, 1907.

THE Houses of Parliament are once more the scene of life, and the business of the Session is now in full swing. In consequence of the absence in England of the Prime Minister at the Colonial Conference, Parliament did not meet until Tuesday, 25th June. The opening ceremony was performed by His Excellency the Administrator (Mr. Justice Beaumont) in the Town Hall.

Federation.

The Speech from the Throne contained reference to several matters of interest to farmers. After referring to the intention of the Transvaal to retire from the Customs Convention on the 30th June, 1908, His Excellency stated the opinion of Ministers that, upon the establishment of Responsible Government in the Orange River Colony, the time would have arrived for the discussion of the question of the federation of the British States of South Africa. He added that Ministers would be prepared to ensure the adequate representation of this Colony at any Conference that might be convened for that purpose.

Shipping Freights.

Reference was made in the Speech to the vexed question of shipping freights; and, speaking on the same subject during the debate in the House on the Address-in-Reply, Mr. Moor stated that he had brought to the notice of the shipping people "the unfairness to this Colony with regard to disparity of rates between South African ports and here, and he had done his best to get an amelioration of the rates, which he looked upon as almost intolerable for Durban. He had had submitted to him figures which went to show that Durban, in spite of all that had been done in regard to the improvement of the harbour (which he was proud to declare was second to none in South Africa), was handicapped by the through rate from Europe to Johannesburg, and made it the dearest of any port. He asked what would have been the condition of things when it became generally known that under the existing conditions Durban was the dearest harbour for getting at the Johannesburg centre?" What Mr. Moor has been able to effect in the way of reductions will be seen from the following statement. The rates have been proposed by Sir Donald Currie, with the approval of ship-owners:—

	Present Rates.		Proposed.	
CLASS I.	s.	d.	s.	d.
Capetown	42	6	42	6
Algoa Bay	42	6	42	6
East London	48	9	48	9
Durban	52	6	50	0
CLASS II.				
Capetown	31	3	30	0
Algoa Bay	31	3	30	0
East London	38	9	37	6
Durban	40	0	37	6
CLASS III.				
Capetown	25	0	25	0
Algoa Bay	25	0	25	0
East London	32	6	30	0
Durban	32	6	30	0
CLASS IV.				
Capetown	22	6	22	6
Algoa Bay	22	6	22	6
East London	30	0	27	6
Durban	30	0	27	6
CLASS V.				
Capetown	20	0	20	0
Algoa Bay	20	0	20	0
East London	27	6	25	0
Durban	27	6	25	0

Agricultural Department.

Ministers were impressed with the necessity for the fullest development of the agricultural possibilities, and for the better exploitation of the mineral wealth of the Colony, said His Excellency; and no efforts would be spared to attain those ends. One method which Ministers felt convinced would be of material assistance would be the establishment of an Agricultural Loan Fund, to provide for which a Bill had been prepared on the lines of similar legislation in other Colonies.

The vitalising of agricultural conditions with a fresh flow of money obtainable on easy terms is undoubtedly, as Mr. Moor pointed out in the House on one of the first evenings of the Session, one of the factors which will go far towards the lifting of the depression that at present overspreads the country. Too much importance had in the past, he said, been attached to the mineral wealth of South Africa in general and of Natal in particular. Mr. Moor was not decrying the mineral possibilities of the Colony when he said this—and he took care to emphasise that fact—but he recognises that true stability can only arise out of the steady development of the agricultural resources of the country.

Agricultural Credit.

Briefly, in the words of the full title, a Bill "to authorise the Government to assist persons engaged in agricultural and pastoral pursuits by loans on immovable property, and to appoint a Board for the management and administration of a fund created for that purpose," has been introduced. The fund is to consist of such sums as Parliament may from time to time grant for the purpose, and is to be administered and managed by a Board consisting of five Commissioners appointed by the Governor. The Governor may also, from time to time, borrow to the extent of the whole of the unused balance, amounting to £700,000, of the loan of £1,000,000 provided by Section 63 of the Agricultural Development Act, 1904. Advances may be made by the Board to farmers and landowners for any of the following purposes:—(*a*) To pay off existing liabilities; (*b*) to effect improvements, including water pumping and storing and irrigation, fencing, clearing land and cultivation, planting of orchards, etc., farm buildings; and (*c*) for the purchase of live-stock and plant. As security in making advances, the Board must have a first mortgage on land of either of the following classes, such land not being within the limits of any borough or township:—(*a*) Freehold land; (*b*) quit-rent land; and (*c*) land held under agreement of purchase from the Crown. The amount advanced is in no case to exceed three-fifths of the value of the land as determined upon by the Board; and, for the purpose of arriving at such value, the Board may in its discretion add the value of any immovable property already on the land in question or intended to be erected thereon with the proceeds of the loan applied for.

The extent of the loans that may be granted is confined within a certain minimum and maximum. No loan is to be for a less amount than £50 or for a larger amount than £2,500; and, further, no person who is already indebted to the bank to the extent of £2,500 can receive any further advance. That the fullest possible advantage is to be given to the farming community as a whole from the Act, is evidenced by the provision that all applications for advances under £500 shall have precedence over those for a larger amount. The interest chargeable for loans is to be fixed by the Governor by regulation.

Loans will come under two categories: money advanced for a limited period not exceeding five years, repayable at the end of the period of the loan—known as a "fixed loan"; and money advanced for a period not exceeding thirty-five years, repayable by instalments during such period—described as an "instalment loan." A fixed loan will be repayable (without sinking fund) at the end of the term for which it is granted, provided that the mortgagor may, at the date on which the half-yearly interest is due, repay any sum not less than £5, or a multiple thereof, in reduction of the principal sum. Instalment loans, with interest thereon, will be repayable in not more than seventy half-yearly instalments. Provision is made that all monies advanced by the Board shall be applied strictly to the purpose for which the loan was granted; and it will be the duty of the Board to see that this is done.

Land Banks in the Cape Colony and Transvaal.

Natal does not stand alone in the matter of the proposed creation of a Land Bank. Cape Colony and the Transvaal are both introducing the necessary legislation for a similar purpose; and a *Reuter's* telegram at the end of June described the Cape Agricultural Credit Bank Bill as "the most important measure of the Session." It may be of interest to examine the proposals of the Cape and Transvaal Governments in the direction of the establishment of agricultural credit systems in their respective Colonies.

The raising of the necessary funds for the Cape Bank is to be accomplished by means of debentures on the guarantee of the revenues of the Colony, up to a maximum of a million sterling; whilst in the case of the Transvaal, the funds of the bank are to include such monies as Parliament or the Governor may from time to time vote or place at the disposal of the bank. In both Colonies, as in Natal, the funds of the banks are to be managed by boards of five members. In the Cape Bill the loans which may be granted range from £50 to £5,000; in the Transvaal the minimum is £100 and the maximum £3,000. In both cases, as in the Natal Bill, applications for advances under £500 are to have precedence over those for a larger amount. Provision is further made in the Cape Bill for the advancing of sums not exceeding £10,000 to Co-operative Farmers' Associations.

In the Cape measure the following are the purposes specified for which advances may be made to farmers:—(*a*) To pay off existing liabilities in cases in which the Board approves of an advance for improvements; (*b*) to effect improvements, including water storing and irrigation, fencing, clearing lands for cultivation, planting of orchards and vineyards, and farm buildings; and (*c*) for the purchase of stock and plant. The Transvaal Bank will be empowered, it is proposed, to make advances for the following purposes:—(*a*) The promotion of agriculture, grazing, horticulture, or of a dairy, and of rural industries generally; (*b*) the purchase of stock, machinery, seeds or implements; (*c*) the addition of any improvements to any agricultural land, such as buildings, fences, irrigation works, dams, or furrows; (*d*) the payment of liabilities already existing on any land; (*e*) the purchase of any land for any of the purposes described in (*a*), (*b*) and (*c*), by a person whose financial resources are deemed adequate to carry on such purposes.

The Natal Bill in Parliament.

Our Parliament has very favourably received the Land Bank Bill, which has brought to the Government some praise from members imbued with Australian ideas. At the second reading of the Bill some of those Members even thought the measure did not go far enough, and there was some discussion as to whether the provisions of the Bill would enable assistance to be given to leaseholders. It was stated that in the Australasian States money could be borrowed on the security of leasehold land, and that, if the full benefit was to be derived from the Natal venture, we should make corresponding provision in our Bill. Mr. Moor pointed out, in reply, that small holders would derive greater benefit from the Bill than "large" farmers, by reason of the proviso in the Bill to the effect that precedence would be given by the Bank to applications for loans under £500.

Mr. Deane, in moving the second reading of the Bill, after explaining the *modus operandi* of the measure, pointed out some of the beneficial effects that would attend the establishment of a Land Bank in this Colony at the present juncture. The Government, he said, were taking a practical step in the direction of developing to its fullest capacity the land of the Colony, and what they wanted to aim at first was to provide what the people of the Colony required, and to serve the markets of South Africa; and, secondly, to produce a surplus which would find a market oversea, and bring into the Colony its equivalent in capital. Every ton of produce raised in the country meant increased work for the railways and increased wealth for the Colony, while every ton imported meant the depletion of the Colony of its equivalent in capital. Increased production, as Mr. Deane said, means decreased cost, and the cost of living will become cheaper; and the Minister pointed out that when the farmers were in possession of the money they would be able to obtain from the Land Bank, it would be put in circulation amongst the merchants in this country, and would thus give an impetus to business generally.

On the House going into Commitee on this Bill, Mr. Evans moved, and it was resolved, that the Bill be referred to a Select Committee for consideration and report. This Select Committee consists of Messrs. Clayton, Bosman, Smythe, Oliff, Walker, and the Minister of Agriculture.

Land Tax.

Among the Bills before Parliamentt are two to provide for the taxation of unimproved land values. "Unimproved value" is defined as "the capital amount for which the fee simple estate in such land would sell under such reasonable conditions of sale as a *bona fide* seller would require assuming the actual requirements and improvements by the owner or occupier, if any, had not been made; and in case of conditional purchase land of which no title shall have been issued after deducting also the balances or amount of purchase money due to the Crown in respect of the same." It is sought to impose a tax upon the value of all unimproved lands in Natal with the following exceptions:—(*a*) Land of the Crown and Native Trusts not subject to any agreement or purchase and sale; (*b*) land belonging to the Imperial War Department or Admiralty; (*c*) land situated within the limits of any municipality, township estab-under Law No. 11 of 1881, as also land brought within the provisions of the Water Supply Act, 1897; (*d*) park lands, public roads, public cemeteries, or other public reserves; and (*e*) lands held in trust when used exclusively for religious purposes. The tax, together with all fines, costs, and charges lawfully claimable in reference thereto, is, until payment, to be a first charge upon the land taxed, in priority to all sales, conveyances, mortgages, charges, liens, rates, and encumbrances whatsoever. In the second of the two Bills it is proposed to fix the tax—which will be leviable as from the 1st July, 1907—at the rate of one penny in the pound, with a minimum of £1 in the amount payable by any person yearly. Section 2 of this Bill enacts that "any owner not personally occupying his holding, or each separate holding owned by him, if more than one, of land subject to the tax, shall, in respect of each holding not so occupied, pay double the amount of land tax, as provided by this Act, unless he shall satisfy the Commissioner that for a period of at least six months during the financial year preceding that for which the tax shall be payable such holding has been occupied by a European who shall have carried on *bona fide* farming or agricultural operations thereon. In the case of purely grazing farms the occupation period as aforesaid shall not be enforced: Provided that in case any rent is levied from such farm, either from Native or Indian tenants, the double tax shall be paid, and provided further, that whenever the Commissioner shall be satisfied that any lands are unfit for European occupation, and that no Native or Indian rents are levied thereon, the provisions of this section shall not apply to such lands."

East Coast Fever.

In addition to the Bill dealing with East Coast Fever referred to in the last issue of the *Journal*, an important measure in connection with the suppression of the disease has been brought in by the Government this Session, in the shape of a Bill "to provide for the compulsory fencing of lands within the Colony of Natal." This Act will empower the Minister of Agriculture to cause the erection of fences along the boundaries of any farms within an infected or suspected area, or of any native location or town lands within such an area. The cost of erecting any such fence along the boundaries of a farm will in the first instance be defrayed by Government from funds voted by Parliament for the purpose. The money thus spent will then be repayable, in equal yearly instalments, by the owner of the farm fenced—or, in the case of the erection of a fence along the common boundary of two adjoining farms, by the owners of those farms in equal portions—together with interest at the rate of 5 per cent. per annum. Such instalments will commence two years after the fencing is completed, and will be so calculated and fixed that the initial cost, together with the interest, will be wholly repaid within a period of ten years from the date from which the first instalment becomes due. With regard to the erection of fences upon farms held under lease, it is provided that the lessor shall be entitled to receive from the lessee a payment of 8 per cent. per annum on any sum he may have paid to the Minister of Agriculture. Such payment shall be deemed in law to be part of the rent of the farm. It will be permissible for any person liable for the cost of the erection of a fence under the Act, to contribute "approved material or labour or transport towards the cost of such fence"; and he will be credited with the value (determined, in the absence of agreement, by the Resident Magistrate of the district) of such contribution.

In addition to the fencing of private farms, native locations, and town lands, the Minister of Agriculture will have power to cause to be fenced (*a*) any roads, public or private, traversing any part of the Colony; and (*b*) any boundaries of the Colony or any area in the Colony marked off from any other part of the Colony.

A further Bill of interest is one to be introduced "to amend Act No. 53, 1906, entituled Act "To authorise the Governor to borrow the sum of £100,000 from the Consolidated Loans Fund, to be used for the prevention or suppression of the disease known as East Coast Fever.'" In substitution of Section 3 of the Act referred to, it is proposed that the purposes to which the Act applies shall be for the advancement of loans to owners of cattle or others who are in need of such assistance for fencing their lands, for purchase of transport animals or otherwise for the prevention or suppression of East Coast Fever; and for the purchase by the Government of such donkeys, mules, horses, wagons or gear as may be necessary for the establishment of a transport service in any district in which the movement of oxen may be prohibited under the provisions of the East Coast Fever Act, No. 32, 1903, and all amending Acts which are now in force or may hereafter come into force and any regulations made thereunder.

The Economic Side of Agriculture in Natal.

A PAPER READ BEFORE THE SOUTH AFRICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

By E. T. Mullens, Secretary, Minister of Agriculture, Natal.

THE LAND QUESTION.

In order to secure a true view of the economic side of agriculture in Natal, we must know the amount of land used or required by Natal agriculturists and the ratio this bears to the area available for agriculture.

Persons adversely criticising agricultural methods in this Colony are wont to compare our agricultural output with the total area of the Colony, overlooking the fact that an enormous tract of country is occupied by native locations, and, further, not making allowance for the large area granted for commonage to the various townships and villages, nor for the Berg lands or the Thorn Country, neither of which will furnish grazing for stock during more than one-half of the year, rendering it necessary for persons farming stock on a large scale in those localities to have two farms, a Berg farm for summer and a Thorn farm for winter grazing.

		Acres.
The total area of Natal, *not including Zululand*, is approximately		16,000,000
The native locations in Natal are, approximately, in extent	2,500,000	
The commonages of townships and villages are, approximately, in extent	100,000	
There are still unalienated, approximately	1,000,000*	
		3,600,000
The amount of land alienated to white people is, therefore, approximately		12,400,000
Of this acreage, our agricultural statistics show us that the white population cultivates	400,000	
The grazing required for the stock shown to be in the possession of the white population is, approximately	5,000,000	

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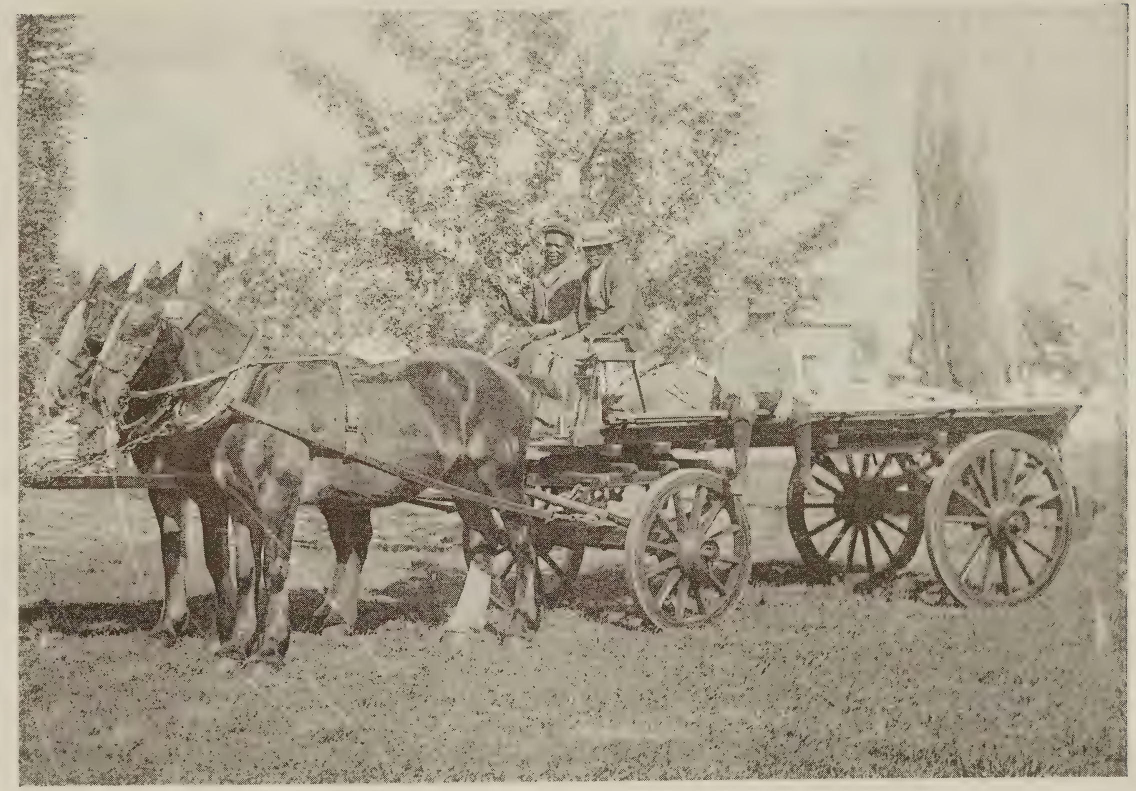
* These unalienated lands are mostly on the slopes of the Berg and in the Thorn country, and are, generally speaking, rough and broken and inaccessible.



ROYAL AGRICULTURAL SHOW.

First Prize pair of Trolley Horses in Harness. Exhibited by Pietermaritzburg Corporation.

The Indian population of Natal cultivates, approximately, one-tenth of the quantity cultivated by the white people	40,000	
The grazing required for the stock shown to be in the possession of the Indian population is, approximately	60,000	
		5,500,000
This leaves unaccounted for		6,900,000
In respect to this acreage, there must be borne in mind the native tenants occupying farms owned by the white population and running stock thereon. It is difficult to arrive at any satisfactory statement regarding native cultivation and stock on such land. If, however, we take it that on those lands there are half of the total (*i.e.*, inclusive of locations) cultivation and stock of natives—which I do not think will be very wide of the mark—then we also have to make allowance for land cultivated by natives on farms owned by white people ..	240,000	
Grazing required for stock belonging to natives and running on farms owned by white people	2,660,000	
		2,900,000
Unaccounted for		4,000,000*

In estimating the area required for grazing on the ordinary veld of Natal, I have allowed ten acres for each head of cattle or a horse, and two acres for each sheep or goat; which I am advised by well known stock-farmers is a fair average under present conditions.

By the use of exotic grasses, the acreage required per beast can, of course, be considerably reduced, but my figures tend to show that, at the present time, there must be some four million acres of privately-owned land lying idle—more than enough to satisfy all the present demand—with the probability of a still greater amount coming under that classification by the use of improved pasturage. The most important economic question before Natal at the present time is that of forcing this unused private land into the market.

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* I am aware that of this 4,000,000 acres a considerable proportion consists of mountain slopes, bush, &c., but even making a liberal allowance for such land, there still remains an enormous quantity of land not fully utilised.

THE NATIVE QUESTION.

There are, dealing in round figures, just under 1,000,000 natives in the whole of Natal and Zululand, who are distributed, approximately, as follows:—

Zululand	220,000
Native locations and mission reserves in Natal	275,000
Private lands	400,000
Crown lands	20,000

You will observe that there are 400,000 natives on private lands in Natal, as against 275,000 in native locations and mission reserves, and on Crown lands, *i.e.*, approximately speaking, there are four natives on private lands to 2¾ in native locations.

From whatever point of view we regard the economic side of agriculture in Natal, we observe it influenced by the presence of the native population, and I know of no other self-governing British Colony where agriculture is so profoundly affected by a native population as in Natal. It is *the* disturbing economic factor, and the one which has to be, and must be, reckoned with and mastered before agriculture in this Colony can ever be placed upon a satisfactory basis. We are first of all affected by the mere presence of the native population. No matter whether these natives were the original inhabitants of Natal or whether they were driven out by Chaka, and returned and multiplied under the protection afforded by the white people, or whether they are all the progeny of Zulu refugees, the fact now is that they are here, and have been here for two or three generations. Writers on the subject of the native squatters on our farms frequently advocate our putting into force the old Squatters' Law, Ordinance No. 2, 1855, and, in favour of so doing, refer to the Orange River Colony, where the law is enforced limiting the number of squatters on any one farm. Such writers overlook the fact that the total area of the Orange River Colony is 50,000 square miles, with a native population of less than 250,000, against our area of 25,000 square miles, and total native population of, approximately, 700,000. The Orange River Colony is twice as large as Natal, but has only 4 natives to the square mile, against 30 to the square mile in our case, *i.e.*, excluding the locations. It is easy enough to shift natives when there is ample accommodation for them on the next farm; but, were we to adopt a policy of limiting the numbers of natives on any particular farm, they would be in the cruel position of Dickens' "Poor Joe," being constantly moved on without ever obtaining any information as to where they are to go beyond that of "On! on! on!" This you will see is another of our economic problems.

One of the consequences of the presence of the native tenant is the temptation to indulge in what is known locally as "kafir farming"; and my fear is that too many have yielded to this temptation. Once a man has bought by public auction a piece of Crown land on the twenty-year-instalment system, the land to all intents and purposes becomes as truly his as if it were in freehold; and, from the date of his receiving his certificate of allotment, his power of obtaining rental from his native tenants is only limited by their ability to pay. It consequently happens that the most remunerative form of farming to the purchaser may be that of squeezing out of his native tenants as much rental as they are prepared to pay rather than flit. In justice to some so-called "kafir farmers," it must be pointed out that the position in actual practice is often this: A purchaser finds that natives are cultivating and running stock on the land which he has purchased and that they are unwilling to quit; to put the law in force and compel them to move will injuriously affect him as regards his labour supply; the natives express their willingness to pay him rental rather than leave; hail him as their father when he reluctantly decides he must let them remain; and, as he has to submit to the nuisance of their stock and their mealie gardens, he considers himself justified in making them pay what may seem a comparatively high rental. As the rentals received from the natives go a long way towards, if they do not actually meet, the amount of his annual instalment to the Government, it is only natural that the purchaser of the land should tend more and more to rely upon that income. The definition of a "kafir farmer," however, is only properly applicable to the man who deliberately lays himself out for native tenants and encourages as many as possible to dwell on his land, living on their rents and doing no genuine farming himself. The dealing with and checking of this kafir farming is a great economic problem.

To revert to one side of the question already mentioned, we are faced in this Colony with the presence of the native population, from whom we draw and must by force of circumstances continue to draw our agricultural labour, *i.e.*, our unskilled labour. I know of nothing in our climate, as compared with that of other portions of the world where European agricultural labourers have worked, to prevent European agriculturists themselves doing the whole of the manual labour; but it is obvious to anyone acquainted with Natal conditions that it is hopeless to expect European and native agriculturists to work side by side in our fields. It is not to be expected, and I must go further than that and state that it would be an economic waste for such a state of things to occur. Our natives are born agriculturists, and the province of the white man in Natal agriculture should be that of training, developing and supervising the excellent raw material of native labour. In brief, I consider it far more economically sound for the white farmer to spend his time in supervising one or more gangs of natives rather than for him to attempt to till his fields with his own hands. The native's aptitude as an agriculturist is that which proves the great drawback to his employment as an agricultural labourer on a white man's farm, because, at the very time when the white man wants his labour for putting in his staple crop, the native himself wants to be off to put in his own mealies, and, like a sensible man, he looks after himself first. We are thus faced with the same problem as that which has been discussed, and, I think I may say, settled in Great Britain and other advanced agricultural communities, namely, that of retaining the agricultural labourer permanently on the farm. The solution is a very simple one: the farmer or the land-owner has to make it worth the while of the labourer to remain; and this is now being done in European countries by providing the agricultural labourer with a decent cottage on a healthy portion of the farm—not a hovel in a swamp as used at one time to be only too often the case—with enough fenced-in land for him to have his own kitchen garden, poultry run and pig-sty; and with opportunities for social intercourse by means of encouraging clubs, libraries, etc. It would be easy enough to settle this question in Natal, were the native satisfied with the same amount of land with which an indentured or a free Indian would be satisfied; but the native dearly loves his own mealie patch, and, not yet being educated up to the use of manures, requires a considerable tract of country for this, shifting his patch from year to year as he wears out the soil. Above all, he is, by immemorial custom, wedded to his cattle. By training and education, we may reasonably expect within a generation to accustom the native to use our advanced agricultural implements and our manures. Indeed, it is astonishing in some districts how quickly the natives pick up those ideas; and this advanced agriculture will enable them to do with less land for cultivation; but I am afraid the day is yet far distant when they will be induced to give up their cattle. Economic pressure and economic pressure alone will, I believe, effect this change. At present the native regards the cattle as his bank. He puts all his savings into cattle, the more cattle he has the wealthier he is regarded by his neighbour. To have a native resident on a farm as an agricultural labourer means, therefore, the provision not only of a kraal site and a mealie garden, but grazing, and probably unlimited grazing, for his cattle. This, of course, is serious. It was not so when the average farm consisted of from 4,000 to 6,000 acres at least, and is not so at the present day on large farms; but in the case of smaller size farms the requisite grazing cannot be spared, so that this custom is a serious drawback to closer settlement so far as labour is concerned. The consequence of a non-resident agricultural labourer is the same as that experienced in other countries: he naturally wishes to go home every now and then to visit his family, to look after his cattle, to plant his crops, and for numerous other reasons which are the despair of the Natal farmer. Possibly, the presence of East Coast Fever in the land and the consequent decimation of the native cattle which appears to be threatened may help to hasten the day when his habits will change; and town life and the imitation of the white man will also doubtless have their effect; but the native is very conservative, and, as we ourselves know, customs—and especially agricultural customs—die hard.

THE INDIAN QUESTION.

Next in importance as an economic factor in agriculture in Natal to the native question is that of the imported Indian. The demand for the Indian arose from the sugar and tea planters as a consequence of the irregularity and uncertainty of the supply of native labour due to the causes already touched on by me. The Indian, owing to the system of indenture, could be relied upon for a period of five years; the area occupied by him on the farm or estate was negligible; he had no cattle; and his especial value was that of a resident agricultural labourer, always available for emergencies. His economic value in agriculture was, therefore, great, although from the points of view of pay, passage money, rations, housing, etc., he was not and never has been a cheap labourer as compared with the native. Had he when his time of indenture was up been content to return to his native land, no more would have been heard of the Indian; but the Coast planters who originally imported him have brought about an unforeseen economic factor owing to the Indian remaining here after his term of indenture, becoming himself a landowner and a farmer, and multiplying. We have in all imported some 150,000 indentured Indians, a large number of whom have remained permanently here, claiming their rights of citizenship as British subjects. In their train, the Indians have brought the Arab trader who, naturally not confining himself to the Indian trade, has proved a disturbing economic factor in the commercial world. The free Indian further has turned the tables on his former European master by becoming a competitor in his own market. Almost the whole of the kitchen garden trade is now in the hands of Indian farmers and hawkers. A large fruit trade also is done by the same community, and Indians have even become sugar planters and taken up other forms of farming on a large scale. For every 100 Indians and Asiatics there were in Natal in 1891, there were 244·88 in 1904. As might be expected, practically the whole of the farming is confined to the Coast districts, there being 38,000 acres cultivated by Indians in that portion of the Colony, as against less than 3,000 acres in the Midlands and Uplands of Natal.

As regards the Indian competition to which I have already referred, the future of the fruit trade lies, I believe, in the hands of those who are prepared to deal with the product on a wholesale scale and in a thoroughly up-to-date manner. There will then be no room for the scaly, diseased, under-sized and damaged fruit at present dealt with by the ordinary Indian hawker; but the Indian will, I feel sure, for many a year to come be able to hold his own as a market gardener on a small scale. It would scarcely pay the European farmer to grow the petty things in which the ordinary Indian will deal; but, wherever vegetable produce can be sold on a large scale, the European can still hold his own. It must not be overlooked that "Sammy," in spite of his faults, is a very welcome visitor to many a housewife in town with his basket of vegetables, and does certainly at the present time fill a want.

MARKETS.

The Natal farmer is, generally speaking, fortunately situated in having his market close to his own door. For his staple crop of mealies, there is an enormous demand throughout South Africa, and the whole crop can usually be disposed of locally at remunerative prices. Natal is capable of producing far more mealies than it at present does, and, should the export of mealies to Europe turn out to be the success which is anticipated, the result will be not only that the farmer will be relieved of all anxiety as to where to dispose of his surplus crop, but that he will be induced to extend the acreage under mealies from year to year until every available inch of ground is utilised. The whole of our sugar crop is disposed of locally, and we shall be able to consume in our own markets (*i.e.*, within the Customs Union) the whole of the sugar that Natal will be able to produce for some years to come. The same happy condition of things applies to our Natal teas, provided always, of course, that we maintain a high standard, with the prospect of an over-sea market when we have more than provided for our own wants; but for neither sugar nor tea do we at present need to seek any export trade. Our wattle bark and our coal have made their reputation in the world, the trade in each is increasing yearly without any prospect of its being overdone for the present, and provided that our exporters ship nothing but good, honest stuff, our good reputation will be maintained. The whole of our wool can always be exported at remunerative prices; but there is room for great improvement in the packing and selecting of the wool, and one day, when the matter has been taken up by the growers themselves, we may hope to see an improvement in our methods with a corresponding improvement in prices and reputation. We can produce as good a tobacco as can be obtained anywhere, but our growers sadly need education in their methods of preparation for the market. The Department of Agriculture recognises this and, with the co-operation of the growers, hopes to shortly effect a marked improvement. There is an almost unlimited scope for dairying in all its branches. Not only is there a vast amount of dairy products imported into the Customs Union, the whole of which ought to and could be produced locally, but it is a truism that dairying creates its own market and taste. We have first of all to catch up to and displace the imported article and then, by educating the taste of the public, to create an unlimited demand for our own dairy products. The native, who proves a disturbing economic factor in so many branches of agriculture, has again his adverse influence here. As before mentioned, he is a large buyer of cattle and, as he is by no means particular as to the breed so long as he gets an animal of a passable appearance, those who cater for the kafir trade frankly own that it does not pay them to go in for better breeds or higher grades of cattle. Every animal they can rear can be disposed of to natives, who give no more for a high grade than for a low grade beast, or, conversely, will give as much for the one as the other.

DISEASES AND PESTS.

The conditions under which agriculture can be successfully carried on in Natal are largely determined by the diseases and pests with which we are inflicted. For instance, the prevalence of the disease known as horsesickness renders the general employment of horses for agricultural and transport purposes impracticable. The consequent utilisation of the ordinary ox-wagon perpetuates and spreads throughout the Colony from time to time such cattle diseases as Lungsickness, Rinderpest, and East Coast Fever. Were some effective remedy or treatment for Horsesickness discovered, our agricultural methods would be revolutionised, and the beneficial effects would be so far reaching that a new era of augmented prosperity would commence for Natal. The loss to the Colony from that disease is not only the actual value of the horses which die, but the prohibition of horse-breeding on any large scale, the time lost in transport, the spread of cattle disease by the transport ox and the wasteful methods of ploughing and harrowing with oxen. Horses not being available, if a small consignment has to be conveyed to or from a railway station, it does not merely involve as in other countries the harnessing up of a horse, occupying but a few minutes, and one man's time for an hour or two, but takes two or three kafirs an hour or two to catch and inspan the oxen, after which the clumsy vehicle wends its weary way to the station accompanied by the same two or three kafirs; and the whole day is occupied in the journey to and fro, in addition to the services of the 16 or 18 oxen, the kafirs, and the wear and tear of the wagon. A similar economic waste occurs in the process of ploughing or harrowing . In Europe or America it is a common sight to see the ploughman himself guiding and directing the two or four horses pulling his three-furrow plough. Here, the more common sight is to see one kafir guiding the plough, another voorlooping, a third plying the whip, and possibly a fourth walking by the side with a spade with which to clean the plough as it emerges from the furrow every now and again.

To show the effect produced by cattle diseases, I may instance the Rinderpest plague of 1896-97, which swept through the Colony and reduced the cattle of Europeans from 242,165 to 125,992, and the cattle of the natives from 494,402 to 114,829.

The economic results were various. On the one hand, directly the plague had died out, the surviving cattle increased so much in value that some farmers found themselves much better off than before. On the other, so many sheep were sold to butchers on account of the scarcity of beef, and it became so much more profitable to breed cattle than sheep, that farmers neglected the sheep for the cattle industry, and our output of wool consequently declined. Just before the Rinderpest broke out (1895), there were 969,469 sheep in the Colony, and this number fell to 722,705 in 1897 for the reasons I have already mentioned. Another result was that frozen meat was then imported for the first time, and, the trade having once gained a footing, it has been difficult to dislodge it. Curiously enough, the presence of a still more deadly cattle disease, that known as East Coast Fever, bids fair to give the frozen meat trade its death blow. In Rinderpest days, fresh meat became scarce on account of the cattle dying so rapidly all over the Colony. The only hopes farmers have of saving their cattle, now that the East Coast Fever is with us, is—as an Irishman might say—to hand the animals over to the butcher for slaughter. Where this course of action is not followed and the disease is allowed to take its course, the mortality is enormous. The outbreak of the disease in a herd usually means its annihilation—the owner of the cattle is lucky if he saves three per cent. The mortality in the Colony since the first of January in this year has been at the rate of over 500 head a week, practically 15,000 cattle in the six months. Assuming the average value of these cattle all round to be £5 a head, then the loss to the farming community has been £75,000 in the six months, exclusive of the loss due to absence of ploughing and transport facilities. This disease of East Coast Fever will, while it exists in Natal, prejudicially affect the cattle breeding industry and the allied dairy industry, but directly it is stamped out, as I confidently believe it eventually will, those industries will again take enormous leaps forward. We have many of the fruit diseases and insect pests which trouble other countries, but, fortunately, have so far escaped some of the most devastating of those pests, such as the Codling Moth, etc. Locusts are a disturbing economic factor where young crops are concerned, but the arsenic method of destruction is now so well understood that the hoppers (which do the most damage), can easily be kept in check and destroyed. There is no practicable remedy against the flying swarms, although a natural fungus can be successfully cultivated and be used to help in lessening their numbers. Jackals are a serious menace to the sheep industry in the neighbourhood of the Berg, and the Government has now offered a reward for their destruction, which it is hoped will lead to their being hunted down. Tigers and wild cats are becoming more and more scarce each year, although they still occasionally appear and do a small amount of damage.

OTHER ECONOMIC FACTORS.

I have dealt with the more important economic factors affecting agriculture in Natal in what I deem to be the order of their importance, and time does not permit of my doing more than briefly referring to others. Almost the whole of our farms are held in freehold and tenants are rather the exception than the rule; but every year tends to an increase of the latter class. Leases are more common in the Coast district and regions adjacent thereto than in any other portion of the Colony. The smallest holdings of which I am aware are those at New Germany, Marburg and Muden. The last-mentioned place has had a most successful record in irrigation. Tenants there have paid annually rentals of £1 and £2 an acre for small patches of irrigated land, and have succeeded in saving enough to buy small freehold farms. In New Germany there are 6 and 10 acre holdings, the lessees of which exist on proceeds of fruit and vegetables.

The Customs Union is specially favourable to the farming community, seeds being admitted free, and agricultural machinery apparatus, appliances and implements from the United Kingdom also coming in free of duty. As all our taxation is indirect, the farmer only contributes thereto on luxuries, such as wine, spirits, tobacco, and through the stamps and license duties. He has specially low rates over the railway system for his produce under the South African Produce Rate.

Natal, generally speaking, is a well watered country, and, though we have had what we have called several years of drought, we have never been so badly off as our Australian cousins, who would regard our very worst year of drought as but a very mild infliction compared with theirs. Our climate is a most ideal one, and, in fact, as healthy as can be found anywhere. Malaria is only a drawback in the northern and coastal portions of Zululand, and has never proved any serious trouble in Natal proper. Hailstorms are most vexatious visitations, wiping off in some twenty minutes or so the best results of a season and absolutely ruining the ripening crops; but, here again, as one well-known colonist informed me, though in certain localities they have always to be reckoned with, they usually give time to recover in between, and really bad storms do not, on the average, affect those localities more than once in five years. As we possess within the Colony different climates we shall, with organisation, be able to make ourselves self contained. For instance, by an interchange of seed between the Coast, Midlands and Uplands, we shall be able to obviate importation, keep money within the Colony, and at the same time by sympathetic selection to improve the seed. The average yield per acre of our crops on the ordinary virgin soil of the Colony is low as compared with other countries, but, by the use of manures, there seems to be no reason why our average should not rise from year to year. This, as a matter of fact, our statistics show to be happening. Sufficient time has not yet elapsed to show whether the Government Irrigation Settlements will prove a success. There is, however, sufficient evidence to show that, given the capital and the right class of men, there is no reason why they should not prove a success.

CONCLUSION.

In concluding this all too brief glance at the economic side of agriculture in Natal, I must say that the future prospects of agriculture being, as it should, the main source of wealth of the Colony, seem to me particularly rosy. We are but a young Colony, agriculture is practically still in its infancy, there are hundreds of thousands of acres awaiting tillage or development, we are still groping our way along experimenting in the search for crops specially suitable for Natal conditions and of economic value, each failure is in reality a step towards progress; and I feel confident that each year now will see us nearer that time when it will no longer pay owners of land to allow properties to remain practically idle, waiting for the unearned increment, and when Natal will rightly take its place as one of the exporting agricultural communities, instead of being, as it is at present somewhat contemptuously called, merely a Colony of samples.

A New Fibre Venture.—A new venture for the exploitation of fibre is the Umzumbi Fibre Co., Ltd., which has lately been formed in Maritzburg. The capital is to be £10,000, in £1 shares; with a working capital of £5,000 and a reserve of £2,972, the balance of £2,028 being the amount to be paid, in shares, to the vendor of the two properties to be acquired, situated in Alexandra County—a part of the Colony that is apparently well suited to the cultivation of fibre. The directors of this new enterprise are Messrs. A. J. McGibbon, R. H. Cooper, and W. McLarty, M.L.A., with Mr. Allan Anderson as managing director, and Messrs. L. A. Menmuir & Co., 19, Timber Street, as secretaries.

Alcohol from Currants.—A company has been formed in Greece for the production and exploitation of alcohol manufactured from currants, reports the U.S.A. Consul-General at Athens. The company has at present 100,000 tons of currants to work upon, resulting from the retention law, which does not allow the entire crop to be put on the market each year. This same retention adds to the stock on hand 6,000,000 Venetian pounds of dried currants each year. It is not probable, therefore, the Consul-General says, that the local demand for de-natured alcohol will ever outrun the production. It is more likely that Greece will be able to export de-natured alcohol in large quantities.

Sisal, Mauritius Hemp, and other "Aloe" Fibres.

By T. R. Sim, F.L.S., Conservator of Forests, Natal.

When, six months ago, I left Natal for England in connection with the South African Products Exhibition, I received instructions from the Minister of Agriculture to make enquiries concerning the fibre industries which it might be possible to develop in Natal. This instruction was carried out, but in the meantime so much has appeared in the *Agricultural Journal* on the subject, and mostly sound information, that it is undesirable to repeat here all that has been ascertained, and I will confine myself to such additional information as has not been already given. In doing so I claim no expert knowledge in regard to machinery, but only state what I found, while in regard to the plants themselves and their culture, etc., I had all the kinds in cultivation thirty years ago which are now taking the leading place, and have grown most of them in South Africa more or less regularly though in small quantity since 1888, and can therefore claim some familiarity with them.

"ALOE FIBRES."

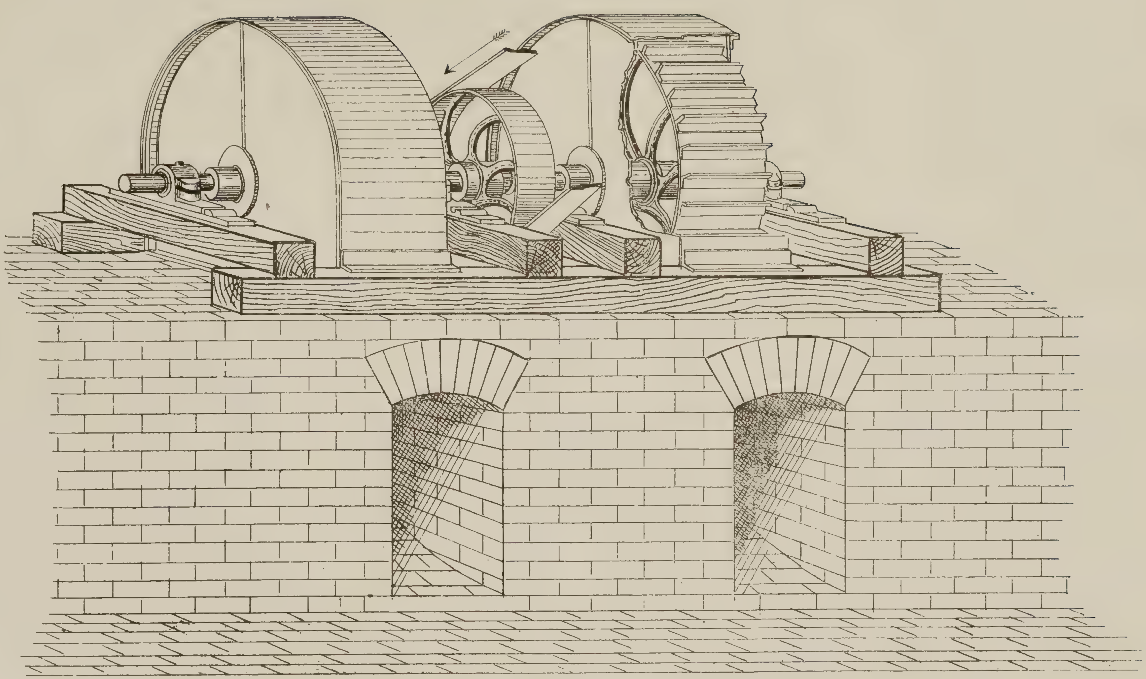
The term "Aloe fibre" is incorrect, inasmuch as the product is not produces by "*Aloes*" but by different species of *Agave* and *Furcraea*, though in a general way these resemble Aloes in habit and appearance; and one species of *Agave* is widely known in cultivation under the common name of *American Aloe,* though not a true *Aloe.* The term "Aloe fibre" is also vague, since it covers the product of many species, and of at least the two genera mentioned above, so it is advisable to drop it and use the more exact common names Sisal Hemp and Mauritius Hemp, though unfortunately these well-known and fully-established common names are also somewhat misleading since neither plant is related to Hemp except in that it produces a somewhat similar fibre.

The botanical differences between these plants of somewhat similar habit is that *Aloe* belongs to the order *Liliaceae*, characterised by having the petals rising from the top of the ovary (seed-vessel), while *Agave* and *Furcraea* belong to the order *Amaryllideae* and have the petals rising from below the ovary. *Agave* has the stamens longer than the perianth (petals), and the style thread-like, while *Furcraea* has the stamens shorter than the perianth, and the style thickened below the middle.

The species of *Aloe* are not producers of fibre fit for economic purposes, but many species of *Agave* and *Furcraea* are so. Both *Agave* and *Furcraea* are represented by many species, mostly natives of Mexico and the adjoining districts of North and Central America, as shown by the following figures from the *Index Kewensis*:—

	Agave. Species.	Furcræa. Species.
Mexico	124	5
Texas, California and Arizona	9	—
Central America	4	4
South America	4	3
West Indies	3	—
Malaysia	3	1
Madagascar	—	1
Horticultural hybrid	1	—
Doubtful	4	5
	152	18

Many of these species have never been seen in flower; some of them vary much in having within the same species forms with and others without thorns on the side of the leaf, or a spine at its point; all resemble one another in a general way and some of them do so very closely; all produce fibre, but they vary exceedingly in the quality and percentage of fibre; while even within any one species the percentage of fibre varies immensely in accordance with local surroundings. In Mexico and the West Indian Islands many species produce fibre which is sufficiently good to be a commercial commodity, and this is so much alike that it is shipped as one kind but of varying qualities in accordance with the preparation it has received. A few years ago it was doubtful which species yielded the valuable fibres, and which were not worth cultivation for fibre; even now few men know more than a few of the kinds, and the resemblance between good and comparatively useless kinds is so great and each varies so much in accordance with surroundings, soil and climate, that the risk is very considerable of getting hold of a wrong kind under the right name, and cultivating it for several years before the error is found out. For instance, Mr. I. G. Baker, in describing *A. decipiens*, which was found to form half the crop in some Florida plantations and was also introduced into the Bahamas as Sisal, remarks:—"The fibre which it yields is very inferior in tenacity to that of *A. sisalana.* I cannot make out any material difference between the flowers of the two species. The name *decipiens* refers to the plant being confused so easily with the forms of *A. rigida*, of which the fibre is so much more valuable that it would lead to loss and disappointment if it were cultivated for economic use." *Furcraea* as grown at Durban and Port Shepstone differs so much from that grown at Maritzburg as to lead to doubts about their being identical, while the latter resembles almost as closely the *Agave* grown in Durban under the name of Sisal Hemp, and to the casual observer might readily be passed as such. In India much con-



TWIN DRUM ALOE FIBRE SCRAPER.

As made by Les Forges et Fonderies de Maurice, Port Louis, Maurice,

fusion existed some time ago regarding the various species of *Agave* and *Furcraea,* as shown in Watt's "Dictionary of Economic Plants of India," *Agave Americana* even being at that time thought to be a contributor to the supply of fibre of this class.

AMERICAN ALOE.

What we know as "American Aloe" in South Africa, the hardy somewhat glaucous kind commonly used as a rough hedge, even in the upper districts, of which one or more variegated forms are in common cultivation as ornamental plants, is not yet botanically identified with certainty. It has usually been considered to be *A. Americana,* but recent investigations throw considerable doubt on *A. Americana* being so widely spread as supposed, and it is possibly *A. Vera-Crux* or some other allied species. With this doubt as to its identity comes an equal doubt as to its fibre value. Some species in this group have valuabe fibre, in others the fibre is comparatively worthless, and though about 30 years ago a factory for working this fibre was established at Grahamstown, the supply of leaves being obtained from the single lines of "American Aloes" used as hedges for miles around—that supply soon became exhausted and the industry succumbed without leaving on record what was the value of the fibre or the cost of growing and working it. It has a fibre, certainly, which suits an up-country native for cordage, but whether or not the plant is worth cultivation for its fibre may be said to have never been properly tried. It has a comparatively small number of leaves; these are difficult to work on account of weight and prickles and thickness, and probably a small percentage of fibre, but against this is the fact that it grows so freely all over South Africa and propagates so readily from suckers, though it does not form bulbils.

In the first volume of the "Imperial Institute Bulletin" are frequent and favourable references to Indian samples of what are called *A. Americana,* and American Aloe; but in regard to the Indian species it is to noticed that recent authorities doubt the presence of *A. Americana,* though its viviparous nature also raises doubt as to its being identical with the South African kind. In one of these references it is stated: "The fibre of *A. Americana,* it may be mentioned, when made into ropes is stronger than Russian Hemp, and the paper manufactured from it is tougher than Bank of England notepaper."

SISAL HEMP.

The fibre product of Yucatan (which produces more fibre of this nature than all other countries together) is largely that of *Agave rigida var. sisalana*—or, as it is often written, *Agave sisalana*—and the name *Sisal Hemp* of commerce includes along with this the other *Agave* and *Furcraea* products of America and its islands. Various local names are in use, but to the commercial purchaser they are all merged, and he buys on the quality.

In Florida the true Sisal (*Agave sisalana*) is in cultivation along with several other kinds; in some of the West Indian Islands Sisal has been introduced and is cultivated to a considerable extent, in others local species are used, and it is now known that there are many species so used in these islands. Concerning German East Africa and the prospects of Natal, Prof. Dunstan. Director of the Imperial Institute, writes me:—

> "The German authorities sent their officers to Mexico and Florida, and in 1893 a plantation was made, containing about 63,000 plants. In 1904 the plantations at Kikogwe and Muera extended to about 3,460 acres and contained nearly 2,000,000 plants. Plantations have also been established in other districts In 1905 about 1,300 tons of fibre was exported, of the declared value of £50,000, which works out at an average of £38 10s. per ton It is estimated that in a few years the Sisal Hemp produced will amount to 10,000 tons, and will represent a value of between £350,000 and £400,000 per annum. Extensive trials have been made in German East Africa of machines suitable for treating Sisal Hemp, and this problem appears to have been successfully solved. . . . My present impression is that Sisal Hemp will probably be the most profitable fibre in Natal. *Sanseviera* fetches a rather lower price and appears to present some difficulties in its preparation. *Furcræa* also is of inferior value to Sisal, and from what you told me I should say there should be no difficulty in producing Sisal in Natal of the same quality as that now so successfully turned out from East Africa."

In Natal there is at present very little of true Sisal Hemp. A good few years ago a small importation was received per post at the Botanic Gardens, Durban, and has been the parent supply of all now in the Colony except plants imported within the past two years. A further and larger quantity imported to the same Gardens as ship's cargo did not yield one plant. From the first consignment a number of suckers were sent to the late Mr. Watt at Port Shepstone, and were the parents of the comparatively small number now to be found in that neighbourhood. A few have been grown in the Durban Botanic Gardens and the stock kept up but not largely increased till recently, since there was previously no demand. There are meantime some of these with flowering poles, and these are producing flowers and seeds as well as a few bulbils. These are not the original plants but suckers from them. A good many plants have recently been imported, mostly by German Colonists here from their friends in German East Africa. Questions having recently been frequently put as to where supplies of young plants of sisal can be obtained from, I have received through the courtesy of Col. Prain, Director of the Royal Botanic Gardens, Kew, and also from the Director of the Imperial Institute, addresses in Florida, West Indies, and India, from which plants are likely to be obtained, which addresses I will supply on application. Advice has also been received from the Agent-General for Natal that Messrs. Vilmorin Andrieux et Cie, 4, Quai de la Megisserie, Paris, are in a position to supply these plants. They can supply, it is stated, at once 6,000 bulbils at £4 10s. per thousand delivered in London, or £5 2s. per thousand for quantities of less than 5,000. A communication on the subject has also been addressed by Government to the German East African Authorities, but up to the time of writing no reply has been received. Fibre cultivation is assuming large proportions in that country; and it should be possible to obtain from them a supply of young plants. Mexico is, of course, the first source of supply which suggests itself to most growers, but on this Col. Prain states:—

> "The people of Mexico, I understand, are not unnaturally averse to the establishment of a Sisal industry in other lands, lest this should diminish their own profits. There are many other species of *Agave* in Mexico some of which especially when the plants are young, closely resemble Sisal, and yet yield but worthless fibre; the risk of being, either through carelessness or of set purpose, supplied with young plants that, when they grow up, prove not to be Sisal at all is so considerable that Mexico is to be avoided as a source of supply."

Col. Prain further adds:—

> "I may mention that in India it has been found that the best distance to plant Sisal is at 5 feet by 5 feet. This gives 1,742 plants per acre. Therefore for 100 acres 175,000 plants will be required. An importation even for 100 acres is thus a formidable undertaking, and even if you decide to obtain young plants from all three sources (Florida, West Indies and India) I am doubtful whether from any of them you could obtain, at once, anything like 60,000 plants, which would be approximately one third the number required. When Sisal was imported by the Government of India, fifteen years ago, 5,000 was considered a large importation.
>
> "Another important consideration is whether Sisal has been proved to thrive well in Natal. If this point has not yet been tested I think it would be well to do so before undertaking so wholesale an importation as is suggested above. I think that perhaps at first it would be well at the outside to import not more than 15,000 plants, viz.;—5,000 from Florida, 5,000 from the West Indies, and 5 000 from India, and to wait until the plants of the first importation reach the stage of poling, when sufficient young plants will be produced locally to supply the whole of Natal."

Professor Dunstan also gives a caution on this. He says:—

> "There is no doubt that the fibre of *Agave rigida var sisalana* is superior to that of *Furcræa gigantea*. The latter fibre is finer and not so white, lustrous or strong as Sisal Hemp. The yield of Mauritius Hemp is ab ut 2½ per cent. of the weight of the fresh leaves, whilst that of Sisal Hemp is usually about 4 per cent. Morever, Sisal Hemp is generally quoted at a somewhat higher price (usually £3 to £4 per ton more) than Mauritius Hemp. Before replacing the Furcræa, which is already well established in Natal, by the Sisal Hemp plant, it would be desirable to ascertain by experiment the comparative suitability of the latter plant to the local conditions of soil and climate, and the comparative yield of leaves and fibre obtained from the two plants."

It can hardly be claimed that the behaviour or yield of Sisal Hemp is already well known in Natal. The *Furcraea* is widely distributed in Natal, and these particulars are known in regard to it, but in regard to Sisal the fact that it lives in a few localities is about as much as we know locally, and the fact should not be overlooked that in other countries and even in German East Africa certain localities are found to suit *Furcraea* better than Sisal and *vice versa*. In the Annual Report of the

U.S. Department of Agriculture for 1905 (page 146) it is stated in reference to Porto Rico, "There are considerable areas of dry rocky limestone soil very similar to that producing the best Sisal plants in Yucatan and the Bahamas." These climatic and soil conditions probably are worth attention in regard to Sisal.

The whole question seems to turn on whether the kind we have (*Furcraea*), and of which plants are easily and cheaply obtainable, is sufficiently good to go on with meantime until these points are cleared up, and until a large supply of Sisal can be raised locally, or obtained from East Africa or elsewhere on terms which are not prohibitive.

MAURITIUS HEMP (*FURCRAEA**).

The answer to this appears to be that it alone has been sufficiently good to make the fibre industry of Mauritius; that is, if our plant is identical with that grown in Mauritius. This has been questioned, and as the source of our supply is quite unknown it is just as likely to have been received from elsewhere as from Mauritius, and may be quite distinct though it is certainly closely allied. Neither seems so far to have been botanically determined with certainty. This is a botanical point which requires clearing up. But this fact at least remains that the sample bale sent to the S.A. Products Exhibition by the Natal Industrials, Ltd., from Port Shepstone, was reported on as follows by the Director, Imperial Institute:—

> "The sample of Aloe fibre from Natal which was forwarded with your letter of March 9th, has now been examined at the Imperial Institute, with the following results:—
>
> "The sample was labelled 'Aloe Fibre, Natal, Major Silburn, Port Shepstone,' and consisted of 5½ ounces of fairly lustrous white fibre, which was fairly well cleaned and prepared. It was of fair but rather uneven strength. The length of staple was 4 feet.
>
> "Chemical examination of the fibre gave the following results:—

	per cent.
Moisture	9·3
Ash	0·9
a. Hydrolysis loss	12·7
b. Hydrolysis, loss	14·7
Acid Purification, loss	1·7
Cellulose	75·5

> "The sample was submitted for commercial valuation to experts, who described it as corresponding fairly well with 'good, fair quality' Mauritius Hemp, and valued it at £26 10s. to £27 10s. per ton. At the time of this valuation Mauritius Hemp was quoted in the London Market at £25 to £30 per ton. The above results indicate that the fibre is of fairly good quality and very similar to other samples of *Furcræa gigantea* which have been examined at the Imperial Institute."

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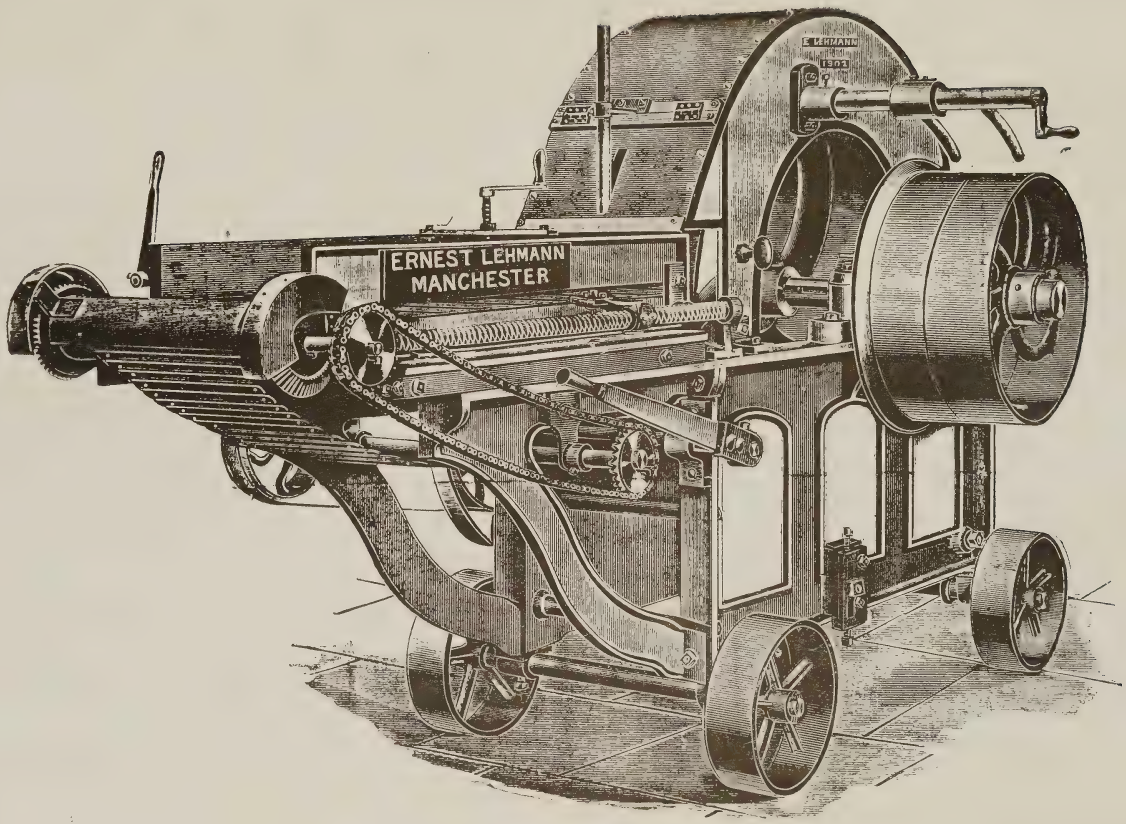
* *Fourcroya* is incorrect the earlier and therefore the correct spelling being as given above.


E. LEHMANN
1901
ERNEST LEHMANN
MANCHESTER

LEHMANN'S EXTRACTOR FOR ALOE FIBRE.

Rope made from the Port Shepstone fibre has also been in use in Johannesburg and most favourably reported on by the engineer using it.

In order to allow of comparison of above chemical examination the following particulars of other analyses of *Furcraea gigantea,* as recorded in the "Bulletin of the Imperial Institute," are given:—

Source.	Moisture. per cent.	Ash. per cent.	Cellulose. per cent.
South Australia	8·5	1·4	74·5
Southern India	9·9	—	77·7
Grenada	10·2	2·4	77·8
Victoria	11·6	2·3	72·2
British Central Africa	8·7	1·1	75·8
Natal (as above)	9·3	0·9	75·5

As the proportion of ash is very low, and that of cellulose equal to the average, it may be considered of good quality and likely to be durable.

Although we have meantime no report of Natal-grown Sisal (*Agave sisalana*), it is interesting to compare with the above *Furcraea* figures those given for Sisal from the same "Bulletin," viz.:—

Source.	Moisture. per cent.	Ash. per cent.	Cellulose. per cent
South Australia	8·8	0·7	79·1
Bahamas	12·8	4·4	75·9
Trinidad	11·6	1·0	77·2
New South Wales	9·8	1·6	77·7
India (Saharanpur)	9·1	0·8	82·4

The above South Australian sample, which was a white strong fibre with a staple of average length, 40 inches, was considered of good quality as Sisal, and valued in 1904 at from £35 to £38 per ton.

It seems then that whatever the botanical name of our *Furcraea* may be, we have got in it a plant which is worth cultivation for its fibre, and of which a stock can easily be got up at once. If Sisal or any other species of *Agave* or *Furcraea* is afterwards found to be better, or better suited to our climate the change to it can be effected as stock is obtainable.

The fact is made a good deal of that Sisal fibre brings rather higher a price; that the percentage of fibre is higher in Sisal, and that its leaves can be fed directly into the raspador without the previous crushing or beating which the thick ends of *Furcraea* require. The difference in price for equal dressing is, however, very small; the percentage varies immensely in each species in accordance with the conditions of growth, and the size and thickness of *Furcraea* leaf also depends on the soil and climate. The advantage of the one over the other is not therefore such as to prohibit the *Furcraea* being profitable. On the other hand the earlier yield of leaves and the longer duration of life seem to favour the

Furcraea, and taking total production, percentage, and longevity and price into consideration, it seems to me likely that *Furcraea* will give the better returns here on reasonably good soil, though the *Agave* may do so on the lighter and more sandy soils. Neither can be expected to be a commercial success where any frost occurs, though both will live through a few degrees of frost; both suffer severely from fire, especially when young, if weeds among them are allowed to burn.

Both require land which is well drained, or in wet soil to be on the top of a bank and so free from stagnant moisture at the roots. The distance apart at which the plants are planted depends on the soil; the poorer and drier the soil the more plants per acre are required. In a recent article on Sisal culture in the Philippine Islands, where the usual espacement is 3 feet x 3 feet, the writer says:—"The Philippine planter, thinking to increase his crop, puts out three times as many plants to the acre as needed, and as a result gets less fibre per acre than if he spread the same number of plants over treble the amount of land." The same writer is very strong upon the injury done to the plants by commencing to harvest when the plants are immature, and also by cutting too large a proportion of the leaves off every year. Such undue harvesting weakens the plant, reduces the quantity and quality of fibre in future years and produces early poling. The treatment of Mauritius Hemp in Mauritius is given in the *Natal Agricultural Journal*, Dec., 1906, page 1,204, where 4 to 5 feet espacement is mentioned, but experience elsewhere, though mostly in other species, indicates the advantage of wider espacement, especially where mechanical cultivation is employed.

With such a heavy product as *Agave* or *Furcraea* leaves, which may run to 30 tons per annum per acre from mature crop, it is necessary when laying down a plantation to consider carefully how the transport is to be done, and to arrange accordingly. The use of an efficient tramway system may be said to be an absolute necessity, permanent along the mains, and with moveable sections as feeders. For the use of these the physical configuration of the estate must be studied, so as to arrange, even before planting, for leaving unplanted the contoured roadways which will be necessary several years later, and for securing with these the greatest service by the shortest route consistent with safety. The selection of the site for the mill must also be guided by this, together with the presence of water for power and washing.

The exports of *Furcraea* fibre from Mauritius in 1905 were:—

	Tons.
To the United Kingdom	1,217·2
To France	393·5
To Germany	27·3
To Belgium	8·4
	1,646·4

In 1903 they were 1,491 tons, of the value of about £45,936 sterling. This fibre is not exported on a large scale from any other country.

SISAL PRODUCTION AND CULTURE.

Prof. Dunston remarks concerning the production and export of Sisal:—

> "It is difficult to obtain trustworthy statistics with reference to the production and consumption of Sisal Hemp, but the following are probably fairly correct.
>
> "In 1903, the following quantities were imported into the countries mentioned below:

	bales.
United States of America	575,167
Cuba	8,066
United Kingdom...	4 286
Canada	1,200
France, Spain, Germany and Belgium... ...	1,711

> "The average output in Yucatan during the ten years ending December, 1901, was 416,328 bales, or about 74,000 tons (each bale weighing about 400 lbs.). In 1903 the production amounted to 590,430 bales (about 105,000 tons),* and in 1905 to 597,289 bales (about 106,660 tons).
>
> "The amount produced in the Turks and Caicos Islands is small; in 1902 the quantity exported was about 223 tons, of value £7,100; in 1904 and 1905 the value of the exports was £6,886 and £5 803 respectively; nearly the whole quantity goes to the U.S.A.
>
> "The Bahamas in the year 1902-03 exported about 1,047 tons, worth £37,524; in 1904 the exports were 990 tons, value £29,557; and in 1905, 1,357 tons, value £37 522. Small quantities are also exported from India. The production in German East Africa was mentioned in my letter of March 4th.' (Quoted above.)

From the Philippines the export of fibre in 1901 was 875 tons, and in 1905 1,878 tons.

The cultivation of Sisal is also being taken up in New Guinea, the Toga Islands, Hawaii, etc.

Concerning the Sisal imported into India in 1892, and which was supplied by Messrs. Reasoner Bros., Oneco, Florida, the larger portion went to the Dauracherra Fibre Company, Cachar, which is now the largest fibre company in Assam.

From a summary of a report by Mr. F. G. Sly, the Acting Inspector-General of Agriculture in India, as recorded in the *Madras Mail* we learn:—

> "The estate in question, on which about 1,000 acres are planted with Sisal, has a rainfall of 80 inches fairly well distributed, which is favourable to the continuous growth of vegetation; and Sisal, Mr. Sly says, as far as he could learn, has no prolonged period of rest. The soil on this estate is a fairly good loam, and by no means poor, being virgin land which was under a dense growth of mixed forest before it was reclaimed. Clay soils are unsuitable; shade is bad; and any water-logging is fatal. As regards the planting out of Sisal,

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* Value £3,333,114 sterling. T.R.S.

> so far from dumping in plants anywhere and anyhow on a wet day, as I have seen recommended, Mr. Sly prescribes the following careful treatment. The young plants should be at least one foot high and even longer, if possible. All weakly plants should be discarded. Pits should be dug about one foot deep and 1½ feet square. In the earlier years the plants in Assam were set out too far apart; the most economical distance is now said to be 9 ft. × 4½ ft. × 4½ ft., *i.e.*, two rows 4½ feet apart, with 4½ feet between the plants in the row, and then a space of 9 feet for convenience in cropping the leaves."

In view of the comparatively heavy rainfall mentioned above it may be necessary to reassure Natal planters by stating that where the Sisal is cultivated in Yucatan the rainfall is very low, and Mr. T. W. Wells, a Queensland grower of Sisal, remarks in a pamphlet on the subject:—

> "Though excessive rains, no doubt, are not beneficial to Sisal, except to make it grow faster, they are not very injurious if the land is naturally drained; but Sisal does not like wet and waterlogged ground. . . . It is the fair to good lands, especially those of limestone origin, situated in dry districts, to which we should, I think, turn our attention for Sisal-growing"

In regard to a series of samples of fibre sent from India and grown at Madras, Bangalore and Chickmagular (*i.e.*, at sea-level and at 3,000 and 4,000 feet above sea-level respectively), the following particulars are given in the "Bulletin of the Imperial Institute," taking the standard of the strongest as 100, though it must be noted concerning the values that as the samples were from different places and not equally prepared, the valuation may have been affected by that:—

Sample.	Comparative Strength.	Approximate Value in London.
		Per ton.
No. 4 Agave sisalana	100·0	£31 to £32
No. 3. Agave sisalana	87·5	£29 to £30
No. 6. Furcraea gigantea (badly prepared)	81·0	£23 to £24
No. 2. Agave Vera-Cruz (badly prepared)	62·7	£22 to £22 10s.
No. 5. Agave Wightii (short fibre)	57·9	£22 to £23
No. 1. Agave Vera-Cruz (badly prepared)	55·3	£24 to £25
But if well prepared		£26 to £28

The species named *A. Vera-Crux* above is similar if not identical with what we call the American Aloe, but as the syonymy of both *Agave* and *Furcraea* is desperately and almost inextricably mixed, and as several almost similar species of the Americana group are widely different in their fibre values it is not safe to assume that the above figures indicate either the comparative strength or comparative value of our American Aloe.

But it is common experience that any difference in the preparation of the fibre affects its value. and in this respect one sample sent to the S.A. Products Exhibition with a green colour was found to be considered unfit for market though of fair length and cleanness in other respects.

In order to secure better colour the following advice is given by the *Queensland Agricultural Journal*:—

> "When the Agave leaves are passing through the machine, a slight stream of water should play on them as they pass under the beater bars On leaving the machine the fibre will have a slightly green tinge, which passes away when the material is hung up in the sun for a couple of hours. It will then appear white and lustrous, but there will still be a certain quantity of gummy matter adhering to the fibres. This can be easily got rid of by washing the fibre for a few minutes after it leaves the machine. All imperfectly cleaned fibre, having still some of the green cuticle or flesh of the leaf attached to it, should be kept separate."

MACHINERY NECESSARY.

The extraction of the fibre from any of the kinds already mentioned is not of itself a difficult matter, but still the method of harvesting and extraction generally rules whether a planter will have profit or less in the business.

The old Mexican method which is still in use in some places is simply a knife fixed at one end and a block of wood; between these the fibre is drawn by hand, and the process is repeated and more pressure applied to the free end of the scraper till the scraping is considered complete.

The next improvement on this is what is known as a *Raspador* in Mexico and as a *Gratte* in Mauritius, the principle in each case being a rapidly revolving drum on which cross-bars are fixed at such distances that when the leaf is pressed under this the cross-bars scrape off the green flesh of the leaf leaving the fibre more or less clean. These machines are usually encased so as to prevent the acrid juice being thrown on to the workmen.

Numerous improvements on these Raspadors have been made, but the principle of all continues to be almost the same, and with the exceedingly cheap labour of Yucatan an enormous amount of fibre still continues to be extracted by this means.

But the Mexican plant being mostly Sisal, while ours is mostly *Furcraea* at present, it is better to follow the Mauritian method, where also *Furcraea* is used, and where, on account of the thickened lower portion of the leaf it is found necessary to use a beater to bring that into form before feeding the leaves to the gratte. In reply to my enquiry I have the following information from the firm who were recommended to me by the Director of Forests and Gardens in Mauritius, viz., Forges and Fonderies de Maurice, Port Louis, Mauritius:—

> "In reply to yours of 10th January, we have pleasure in enclosing herewith two blue prints, one showing a pair of scrapers such as are exclusively used by manutacturers here in the preparation of Aloe fibre. The print* shows one scraper enclosed in its wrought iron sheet guard, and the other with the guard partly broken away to show the scraper blades fixed to the drum. The driving pulley lies between the scrapers and serves to drive both. In this

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* Reproduced. T R.S.

> arrangement it will be seen that the output of fibre may be increased as may be desired, by the addition of other pairs of scrapers without in any way retarding the working of such as already may have been installed. The view shows the back of the scrapers with outlet doorways in the brick foundation for the removal of all waste products, pulp, water, etc. In the front of the machine are arranged two feeding tables upon which the aloe leaves are fed into the scrapers. The beater is of similar design to the scraper, but with fewer blades and different arrangement of feeding. It has been found here that with an installation of four scrapers and two beaters about a ton of aloe fibre can be prepared in one day of 11 hours."

And they append the following quotation f.o.b., Mauritius Harbour:

	£	s.	d.
One pair scrapers, with shaft, pulley and plummer blocks	45	15	0
One beater for ditto	26	16	0
One twin-screw baling press	62	2	0
	£134	13	0
2½-inch turned shafting, per foot	0	5	4
Coupling boxes for ditto, each	1	12	9
2½-inch plummer blocks each	1	16	0
39 inch pulleys, each	3	12	0

It has already been mentioned (*Natal Agricultural Journal*, December, 1906, p. 1,205) that for the African coast, where the Aloe plant reaches much greater sizes than in Mauritius, special machinery has to be provided for, and orders can be sent accordingly.

Most, if not all, of the Aloe fibre machines in the market require steam or other gear, but mechanical ingenuity has been much exercised in the direction of producing a machine which will clean a large amount of fibre with only a small number of men in attendance and thereby reduce the cost of cleaning. Year by year fresh machines claiming to be improvements in this respect and also in simplicity, are put upon the market, and since the companies and planters now putting down fibre plantations will not be in want of machinery for three years at least, there seems little practical benefit meantime in reviewing the machines in use, further than to allow planters to have an idea what the extraction costs, and so form an estimate of prospective profit.

Leaving out the cost of power the Mauritius outfit of four scrapers already mentioned would cost about £200, and treat the produce of say 250 acres. On the Dauracherra Estate (India) already mentioned the machine is a Torroella costing about £600 there, and expected to deal with 600 to 800 acres of Sisal.

Mr. C. Rositzky, Port Shepstone, who is agent for several machines, shows the cost and capacity of a Single Raspador, a Double Raspador, and a Matador in the March number of this *Journal*, page 214. The latter is one of the large machines fitted for a large estate. The Double Raspador is illustrated at page 370. The "La Corona" illustrated at page 379, and for which also he is agent, is made by Hubert Boecken and Co., Duren, Rheinland, Germany, and offered by the factory for £400, and said to clean 12,000 Sisal leaves per hour at lowest speed. This machine is in use in the Bahamas, German East Africa, and elsewhere, and is highly spoken of. Extractor No. A. illustrated herewith, made by Mr. E. Lehmann, of Manchester, is stated to weigh 21 cwts., to require 2 h-p. and to produce about 750 lbs. of fibre per 12 working hours. Cost £65, or on wheels £75. He also makes a hand power machine at £35.

Mr. T. Barraclough, 20, Bucklesbury, London, E.C., makes several machines from about £30 up to £400, which latter is his "Special" Fibre Extracting Machine, and is calculated by him to be able to produce 3,150 lbs. of dry fibre per day.

Messrs. Death & Ellwood, Leicester, produce a small hand-power machine at £45 and a larger machine at £60, and one still larger. The Todd machine, largely used in the Bahamas, costing, with steam engine and steam press, about £1,000, is made by Mr. T. C. Todd, of Patterson, New Jersey, U.S.A., the leaves enter the machine sideway, and it is claimed to turn out 1,500 lbs. of fibre in a day. Mr. A. C. Harris, Leicester, supplies a machine, and Mr. M. F. Fasio, 56, Rue d'Isly, Algiers, is manufacturer of "La Portative" for hand or steam power.

The following machines are stated by the *Queensland Agricultural Journal* to be in actual use in Yucatan:—

Machine.	Number of leaves cleaned in 10 hours.	Actual horse power.	Number of men needed.	Cost. £	Number in use.
Lanaux	130,000	35	3	571	6
Prieto	125,000	60	3	664	90
Stephens	150,000	70	3	1,047	6
Solis (Raspador) ..	9,000	6	2	24	1,200
Torroella	80,000	30	3	476	20
Villamor	70,000	35	3	571	?
Death & Ellwood ..	20,000	3½	2	130	?

From the above it will be seen that there are machines in the market to suit all sizes of estate and pocket. But it is usually claimed that the larger machines save labour enormously. It seems to me that on an estate large enough to require a resident engineer that may be the case, but that on smaller estates the chances of breakage and consequent delay and cost of repairs make the simplest machines claimed the most economical, and allow for the extra boys required. It is also claimed that some machines give a higher percentage of good fibre than others, *i.e.*, they destroy less and consequently produce less waste of fibre. As this can hardly be proved except by machines working side by side on fibre produced on one part of one estate only, the statements in regard to this should be received with caution, except an evident and undue waste occurs.

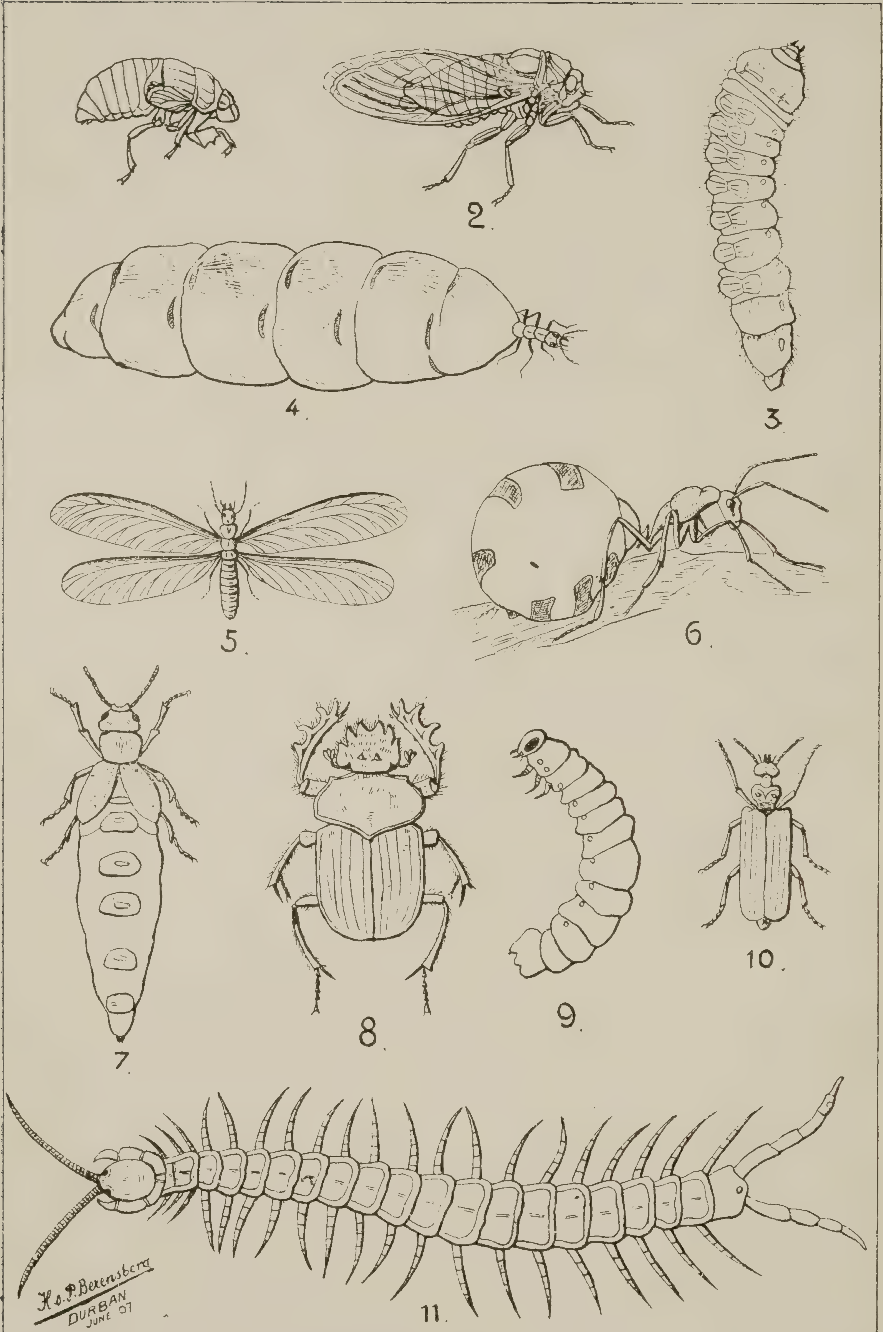
Taking the fibre industry as a whole there appears to be every prospect that it will prove a valuable asset to Natal, and to those who carry it on. If systematically and economically worked with the right kinds success is assured, but the most important point at the present juncture is to see that the best kinds, and these only, are used.

Wattle-growers know the difference in profits yielded by Silver Wattle and Black Wattle respectively, and still neither the analysis nor the rate of growth gave early planters an indication that there was much difference. So also the Golden Wattle with its higher percentage of tannin is found less suitable to Natal than the Black Wattle.

That there is a decided difference between the yield and value of fibre produced by different but very similar *Agave* and *Furcraea* kinds is well known, and the first duty of the planter is to make sure he has the right kind, and then plant so as to suit economical harvesting, leaving machinery out of close consideration until he is ready to use it.

In matters concerning the United States National Government, milk, in order to be designated "standard," has to conform to the following definition proclaimed by the Secretary of Agriculture:—"Milk is the fresh, clean, lacteal secretion obtained by the complete milking of one or more healthy cows, properly fed and kept, excluding that obtained within fifteen days before and ten days after calving, and contains not less than eight and one-half (8·5) per cent. of solids—not fat—and not less than three and one-quarter (3·25) per cent. of milk fat." In Great Britain, milk, to be considered unadulterated, must contain 3·5 per cent. of milk fat, and 8·5 per cent. of solid matter other than fat.

The dairy factories in certain States of America do an enormous amount of work, remarks the *Live Stock Journal.* During the year 1900 there were 9,245 of these factories in operation in the two States of New York and Wisconsin; they produced 440 million ℔. of butter, 280 million ℔. of cheese, 18 million ℔. of dried casein, practically all condensed from skim milk, and 187 million ℔. of condensed milk. They also sold 8½ million gallons of cream. The total value of these products is put at £26,000,000 sterling. New York and Wisconsin States aggregate 67 million acres, and they fed between them in the year mentioned 2,395,000 milking cows, the average value of which in the former State was £6 14s. per head and in the latter about £6 6s.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H o. P. Berensberg
DURBAN
JUNE 07

EXPLANATION OF PLATE.

1 LARVA OF CICADA
2 IMAGO " "
3 LARVA OF PRIONID BEETLE
4 TERMITE QUEEN
5. " (WINGED)
6. HONEY-POT-ANT
7 MELOË (OIL BEETLE)
8. SCARABAEUS SACER
9 LARVA OF PASSALID BEETLE
10. SPANISH FLY
11. CENTEPIED

All Figures nat. size, except 11, which is much reduced.

Uses of Insects as Food, Delicacies, Medicines, or in Manufactures.

By H. VON P. BERENSBERG.

INSECTS are considered by most men as a nuisance, by farmers and gardeners as pests. This is often only too true, but there are a great number which are directly beneficial in destroying other injurious insects or in fertilizing the flowers of fruit trees and crops. The category which will be treated of in this article contains injurious as well as beneficial insects, and it will be shown how mankind has profited by the use of them as food or in various industries.

One of our greatest pests in South Africa is the locust; but at the same time locusts have been used as food in nearly every part of the world where they occur. In the Bible it is mentioned that the Israelites during the passage through the desert after having left Egypt lived sometimes on locusts. Later on we hear that John the Baptist retired to the desert and lived for months on locusts and honey of wild bees. But earlier, Strabo, the well-known geographer, recounts that the Parthians are called *acridophages*, or locust-eaters. Diodorus Siculus, a contemporary of Julius Caesar, gave the same name to a tribe of negroes who lived on the borders of the Sahara, and who were supposed to have no other food than these insects. In both cases it will be right to consider *Pachytylus migratorius* as the one mentioned. In South Africa this locust is replaced by *Gryllus devastator*, or, giving its earlier name, *Cyrtacanthacris septemfasciata* (Serv.)

The natives of South Africa consider the locusts a very welcome food, and eat them roasted or dried; the Hottentots and Bushmen welcome the arrival of a swarm, which gives variety to their menu, which, in the arid districts of South-West Africa, is rather a simple one. They prepare also a fat brown soup of the eggs. Bedouins, Moors, and also the economical-minded Chinese, who waste nothing in the way of food, prepare various dishes out of the locust, eating them raw, cooked, roasted, ground and baked into pastry. Jackson, in the record of his travels in Barbary in 1799, mentions dishes of locusts as being generally served up at the principal tables and esteemed a great delicacy. A pastry which is much valued by Europeans in Algeria is prepared in the following way: The locusts, after having been cleaned of wings and legs, are cut into pieces an inch long and left to soak in rum for a few days. They are then baked in the form of a pie. Sugar is strewn over the dish; a small hole is made in the top, and a quantity of Burgundy wine is added to the contents. But it seems more probable that the alcoholic ingredients of this pastry have more to do with the popularity of the dish than the locusts.

Cicadas (see plate) were kept by the Ancient Greeks in small cages on account of their song, but Aristotle mentions that they were also eaten. He tells us that the males were the finest at first, but afterwards the impregnated females; and that some gourmets preferred the larvae just before the skin burst. The Indians of America still boil the larvae of *Cicada septemdecim* (this larva remains seventeen years as such—hence the name).

Among the ancient Romans the larva of a certain beetle found in oak trees was never lacking on the tables of the nobility. Probably this was the larva of the "Flying stack" (*Lucanus cervus*) or of *Prionus coriarius*, a longicorn beetle. The larva was about 3 to 4 inches long; and before serving was fattened for several days on the best flour.

The larvae of *Prionus damicornis*, which attain the thickness of a man's finger, are eaten in Surinam, in America, and in the West Indies, both by whites and blacks, who empty, wash, and roast them. The larva of the giant clickbeetle, *Tetralobus flabellicornis*, is esteemed a delicacy by the negroes of Central Africa; as the larva of *Malodon Downesii*, a South African longicorn, by the kafir; the larva of the palm-borer, a curculoid of 2 inches in length, by the natives of Madagascar and India; and several larvae of *Passalidae* (see plate) and *Prionidae* (see plate) by the natives of India and Surinam.

Of the Lepidopterous tribe, the fat caterpillars of *Gynanisa maia*, *Nudaurelia belina* and *Bunaea caffra* (all of the Saturnid moths) are emptied, stuck on small sticks, and roasted over the fire by the natives of Natal. Sparrman counts those caterpillars from which butterflies proceed amongst the delicacies of a Bushman's table.

Chinese and allied races eat the pupae of the silkworm after the silk has been unwound, and have many ways of preparing them. Neither do they despise the larva of a hawkmoth, some of which tribe Darwin tells us are very delicious.

Prof. Carl Lumholz, in his book on Mexico, figures a group of Indians engaged in extricating the caterpillars of *Eucheira socialis*, Westw. (a moth) from the silken tents woven together by the larvae. These are a staple article of diet among some of the mountain tribes; and the forests are literally white with the silken webs. Another lepidopterous insect which is used as food is the "Bugong moth" (*Euxoa porphyricollis*) which is collected by the bushel by the natives of New Holland and baked by placing them on the heated ground. It may be interesting to quote here a passage in "Bennett's Wanderings":—"The Bugong moths collect on the surfaces and also in the crevices of the masses of granite in incredible quantities. To procure them with greater facility, the natives make smothered fires underneath those rocks about which they are collected, and suffocate them with smoke, at the same time sweeping them off frequently in bushels-full at a time. After they have collected a large quantity, they proceed to prepare them, which is done in the following manner:—A circular space is cleared upon the ground of a size proportioned to the number of insects to be prepared; on it a fire is lighted and kept burning until the ground is considered to be sufficiently heated, when, the fire being removed, and the ashes cleared away, the moths are placed upon the heated ground, and stirred about until the down and the wings are removed from them; they are then placed on pieces of bark and winnowed to separate the dust and wings mixed with the bodies; they are then eaten or placed in a wooden vessel called a 'walbun,' or 'culibun,' and pounded by a piece of wood into masses or cakes resembling lumps of fat, which may be compared in colour and consistence to dough made from smutty wheat mixed with fat. The bodies of the moths are large and filled with a yellowish oil, resembling in taste a sweet nut. These masses will not keep for a week, and seldom for that time; but by smoking they are able to preserve them for a much longer period. The first time this diet is used by the native tribes, violent vomiting and other debilitating effects are produced; but after a few days they become accustomed to its use, and then thrive and fatten exceedingly on it."

Termites, or white ants, afford an abundant supply of food to some of the African races. The Hottentots eat them boiled and raw, as also do some of the Central African tribes. The Indians in Natal collect the flying insects and devour them after having removed the wings. The natives in some parts of the East Indies make two holes in an ant-heap and drive the termites out by smoke from strong-smelling materials. Anderson, in his journey to Lake Ngami, mentions the same proceeding of the natives near the Lake. In this way thousands of insects are captured and a paste made of them. Sometimes some flour is added. The female ant or queen, in particular, is supposed by the Hindus to be very nutritive.

Honey, as a product of the bee, is eaten everywhere throughout the world, but it may perhaps not be generally known that the honey-combs full of young and old larvae are also eaten by African tribes, and that they are preferred to the pure honey. The natives of Ceylon do the same. An intoxicating drink is made by putting water on the combs and afterwards fermenting it. True ants serve often as food, so Piso tells us with reference to a yellow ant, called *Cupia,* which inhabits Mexico. He further mentions a larger ant called "Tama-joura." A very curious member of this family is the honey-pot ant, *Myrmecocystus mexicanus* (see plate), of which the workers serve as food-reservoirs. These are fed by the individuals of the same heap with all the sweets, juices of aphides, etc., which they gather in their abdomen, this latter attaining a considerable thickness like a small walnut. These living "honeypots," as they are called, are sold by measure on the markets in Mexico. The inhabitants prepare an intoxicant of these ants by crushing them in a mortar, passing the liquid through a strainer and fermenting it in a suitable place. The taste of ants is agreeably acid. In Sweden they are distilled with rye to give a flavour to an inferior gin.

Several products of gallflies are also consumed, the taste being very much like that of a juicy apple. The larva of *Tyrophaga Casei*, a fly which lives in cheese, is not the only one of the dipterous family which is eaten—a dainty some think it, particularly in the Limbourg cheese. When Livingstone and his party visited Lake Nyassa, they were attacked in certain seasons by great swarms of small gnats, which sometimes became so abundant that clothes and body were completely covered with them, they congregated inch thick on the bottom of the boats, and were captured by the natives and boiled and afterwards baked into cakes about one inch thick of a dark brown colour and of a taste like caviare.

Some rather obnoxious insects, such as are found on the head and in clothes, are not without their admirers. Many tribes on the West Coast of Africa, and the natives of Annam and Tonkin, consider them a delicacy. The Eskimos have a special preference for these little animals. In a volume of travels in Polar regions which I have read, there is a passage relating to this habit which is remarkable. A woman complained about her husband, "that he was too clean and that she never could find any delicacies on his capital pasture."

Spiders even have found their lovers. Labillardiere tells us that the inhabitants of New Caledonia eat large quantities of a spider nearly an inch long, which they roast over the fire. But even individuals amongst the more civilised nations of Europe have a similar taste. Reaumur tells of a young lady who cracked every spider upon the spot where she found it. Anna Maria Schuurman ate them like nuts, and Lalande, the celebrated French astronomer, was very fond of these delicacies. Roesel tells of a German who used to spread them on his bread like butter. These edible *Aptera* and *Arachnida* are sufficiently disgusting, but when Humboldt mentions that he has seen Indian children drag out of the earth centipedes (see plate) eighteen inches long and more than an inch wide, and devour them with avidity, then our nausea may give place to horror.

The first cause that led human beings to take to insects as food may have been utter starvation. This was doubtless the case in South-West Africa, where water is scarce and the soil yields very poor products, and in some parts none at all. The starved creatures were thus compelled to seek sustenance in the form of the insects they came across, and subsequently became fond of this form of nourishment as affording a change in their daily menu.

A century ago a great number of insects were used in medical science; of these some had a little medicinal value, others none at all, and others again were positively dangerous. As instances, the following may be noted, which were used:—The woodlouse as a solvent and aperient; powder of silkworms against vertigo and convulsions; millipedes against jaundice; earwigs against nervousness; powdered scorpion for the stone and gravel; fly water for disorders in the eyes; and the tick for erysipelas. Fire gnats were used as a purge; wasps as diuretics; ladybirds against colic and measles; the cockchafer against rabies and plague; ants and their acids as incomparable against leprosy and deafness as for strengthening the memory and giving vigour and animation to the whole bodily frame. Ants still play a role in modern medicine, put in spirits and used against rheumatism.

The Holy Scarabaeus (*Scarabaeus sacer*), an inhabitant of the countries along the borders of the Mediterranean, well known by its habit of making pills of animal dung, was said by Plinius to be a remedy against malaria when carried fixed to the naked body. The Fellahin still use this beetle, deprived of its head, elytra, and other hard parts, soaked in sweet oil, as a remedy against deafness. They place it in the affected ear, where it is left several days and pushed out by heavy breathing with closed mouth and nose. Few insects are nowadays used as remedies, but these amply make up in efficacy for their numerical insignificance. One of the most effective families is the one of *Cantharididae,* which was already known to Hippocrates, the celebrated doctor of antiquity. These beetles, of which more than 800 species exist, contain a powerful vesicatory. This being very poisonous, great care has to be exercised in not taking too big a quantity in preparing tinctures, plasters, pills, and ointments. This poison is called cantharidin, and the most effective is found in the Spanish fly (*Lytta vesicatoria* (see plate), a beautiful green beetle about ¾ to 1 inch long and occurring in the South of Europe. It possesses a characteristic strong smell. There are other beetles of the same family which have the same vesicatory qualities but in a lesser degree, to which belong the *Mylabris,* or blister-beetles, very common in South Africa and the *Meloeid,* or oil-beetles (see plate). The "aqua tofana" of ill-fame, a poisonous drink, which caused the death of many hundreds of people at Naples at the end of the 17th century, is said to have been a decoction of cantharidin and spirits of wine. Lastly may be considered an insect which does not serve as a remedy but more as a "beautifier," and is used to tint tooth powder, tinctures, etc. This is the cochineal louse (*Cocci cactus*), which is the most valuable member of a great family, the *Coccidae.* It measures only a few lines and came originally from Mexico, where it lives on the fig-cactus (*Opuntia coccinellifera*), but has spread now over a great part of the world; it is found also on the "prickly pear" in Natal. The females are dried on hot iron plates and powdered. When dissolved in hot water they give a beautiful carmine dye, which is used largely in the dyeing industry. Two other allied species are the *Chermes* (*Lecanium ilicis*), which lives on the Chermes oak (*Quercus coccifera*) in the south of Europe, and imparts a blood-red or crimson dye to cloth, and was already known to the Phoenicians; and the lac scale (*Coccus lacca*) from the East Indies, which furnishes the product known under the name of shellac. Some aphides also afford dyes as crimson, orange, and yellow.

Wax as a rule is produced by bees, but there are many other insects which deliver us this material. In China wax is produced by a species of coccus (*Ericorus pela*), the male larva of which forms a cocoon which is covered by filaments like fine soft white wool and which are secreted by the pores of the body. The Province of Szetschuan produces every year about 200,000 dollars' worth of this wax, which is worked into candles, and also into images for temples and other objects. Many aphides and cocci secrete a wax-like material, which is called white lac, and is cheaper than beeswax. In Natal a wax insect is found on the wild fig and on some thorny bushes, which boiled produces the material of which the native indunas make their head rings, which are of a brilliant black.

There is no other insect to which science is so much indebted as to the little gallfly, which produces the gallnuts from which ink is made. These galls originate on the leaves of an oak (*Quercus infectoria*), very common through Asia Minor. The blue galls, being the produce of the first gathering before the fly has emerged, are better than the white galls from which the insects have already emerged and which have lost the astringent principle.

Now remains to be considered the most valuable product of insects, namely, silk. Unrivalled for its richness, lustre and beauty, it is a staple article of cultivation in many large provinces of the south of Europe, not to speak of Japan and China; and is one of the most important wheels that give circulation to national wealth. Silk-worms have been reared from time immemorial, being mentioned in the oldest Sanscrit books as one of the chief objects of cultivation and manufacture. It seems that silk was first manufactured in Asia in a country called Sericum. In Europe the mode of producing and manufacturing this precious material became known about the year 530. Two monks procured the eggs of the silkworm moth (*Bombyx mori*) in India, and, concealing them in hollow canes, brought them to Constantinople. From there the silkworms were introduced into Italy, and also, in the reign of Henry the Fourth, into France. Besides the common silkworm, other species are found in India, which are employed in sericulture. Of these the most important are the "Tussoc" and the "Drindy" silkworms.

There are many other products obtained from insects, but the foregoing may be considered sufficient to show the benefit man derives from these little creatures so often despised by unthinking people.

An Indigenous Fibre Plant.

GOMPHOCARPUS PHYSOCARPUS.

THERE are thirty-one known species of *Gomphocarpus* indigenous to Natal, but of this number there are probably only two which are at all likely to be of any economic value as fibre plants, viz., *G. fruticosus,* R.Br. and *G. physocarpus,* E.M. Recently a correspondent sent a sample of fibre from the latter plant, together with a specimen of the plant itself, to this Department with a request for a report upon its commercial value. The Annual Report for 1888 of Mr. J. Medley Wood, Director of the Botanic Gardens, Durban, contained some interesting particulars regarding some samples of fibre that had been submitted to experts in England. Mr. Medley Wood wrote:—

"The fibre from this plant (*Gomphocarpus physocarpus*) has been frequently sent to me, and many years ago I myself prepared specimens for exhibition. In the early part of the year I received two samples, one from Mr. John Dunn, of Zululand, and one from Mr. Plaxton Harrison, of Durban, the last one prepared by a new process. These samples were forwarded to England for report. The brokers to whose agent I gave a portion of the first-named sample say:—

"'We have pleasure to advise you that there would be a ready market for this hemp if it could only be produced in fair to large quantities, and be cleared free from the bark or husk, of which your sample contains so much. We find the colour and strength both very good, and we could dispose of large quantities of this hemp at about equal to £20 per ton c.i.f. London, if it could be cleaned as stated above. If the hemp could be produced a foot longer or so, it would be more valuable. The great beauty of this hemp is its exceptional strength; and no doubt if it could be produced in large enough quantities and the strength increased, it would sell quickly and equally with Manila hemp, the present price of which is, say, £33 to £34 per ton.'

"The remainder of Mr. Dunn's sample, and also that from Mr. Harrison, were forwarded to Kew; and Mr. D. Morris, the Assistant Director, says of Mr. Dunn's sample:—'The fibre from Zululand, which we have accepted as derived from *Gomphocarpus physocarpus,* is evidently possessed of merit, and we forwarded a sample of it to Messrs. Ide and Christy for valuation and report. Of course you noticed that the specimen was in a very rough state, and very indifferently cleaned. Hence the brokers' report, which I enclose, is not conclusive as to the value of the fibre, if carefully and fully cleaned and presented at its best. In this, as in most fibres, the whole thing turns on questions of quality and quantity, and whether it can be placed in the market at such a price as will compete with fibres already known and with an established reputation.' Of Mr. Harrison's sample he says:—'In their present condition they are useless for textile or rope-making purposes. The only use to which they could be applied in this curled-up, crushed state, is for paper-making.'

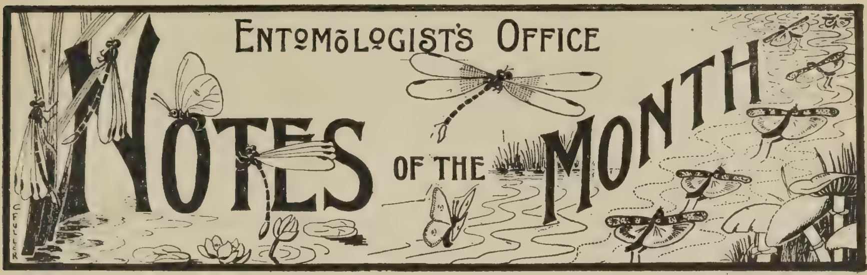
"The broker's report on Mr. Dunn's fibre is as follows:—'This is so imperfectly cleaned that the full merits of the fibre are apparently not disclosed, and in its present condition it would only be available for cordage purposes or as an adulterant of, say, manila or other white hemps of commerce. The fibres apart from the adherent tissue, which would be removed under better preparation, are of excellent colour, but the strength is rather disappointing as compared with manila. From the different character of fibres obtained from endogenous and exogenous plants respectively, it is always difficult to estimate their relative strength otherwise than by taking a given weight of each, and placing them on a testing machine that would properly record their breaking strain.

"'We estimate the value of the *Gomphocarpus* fibre in its present condition at £15 per ton, but thoroughly cleaning would enhance its value 75 to 100 per cent. It is probable, too, that perfectly prepared fibre would find its best market as a material for textile purposes, as a supplement to flax, but we should like to see a thoroughly well-cleaned specimen before giving a definite opinion.'

"With respect to length of the fibre, I may say that, in my opinion, there would be no difficulty in increasing it considerably, provided the plant was cultivated. The specimens sent were prepared from wild plants, which of course are liable to branch repeatedly, and this would not take place if the plants were grown thickly together. The matter of more complete cleaning must be left for further experiment."

At the annual meeting of the Tendring Hundred Farmers' Co-operative Society, it was stated that the sales during the preceding twelve months had amounted to over £5,000. This makes an average of £100 per member. The Right Hon. J. Round, who presided at the meeting, said, during the course of his remarks, that his experience of the House of Commons had shown him that, whenever any trade interest other than farming was affected, those interested in that trade were well organised and thoroughly united; but that when it was a matter affecting agriculture, there was a lack of that unity whose necessity was recognised by all other trades.

ROYAL AGRICULTURAL SHOW.
First Prize Shropshire Down, Ram.
Exhibited by Mr. P. D. Simmons, Mooi River.



Locusts in June.

In my previous memorandum the movements of locusts were dealt with for May and the first half of June. The following notes are based upon information reaching this office between the first and thirtieth of June, so that part of the period previously covered is also included in this report. During June, only 68 reports were received, as against 109 for May. Whether this is due to a diminution in the number of swarms or to a lack of enthusiasm amongst my correspondents I am unable, at this moment, to say.

It is very evident, from the information to hand, that locusts are hybernating successfully from the north of Zululand to Alfred County; and large swarms are settled or circling about certain districts, following, to a great extent, the river valleys a few miles back from the Coast.

Early in the month locusts were circling about the Maringo and Murchison Flats, in Alfred County, but of these nothing further has been heard since the 13th. Alexandra County would appear to be remarkably free, as only one swarm has been reported, and that at the very beginning of the month. There seems to be very few locusts in Durban County; at the back of the Umlazi Location towards Stony Hill there is, I am informed, a swarm settled in the bush. In the Upper Umkomanzi Division locusts are still prevalent, Mid-Illovo, Beaumont, and Richmond reporting settled or circling swarms. During the month, four swarms appear to have visited the neighbourhood of Richmond; one of some magnitude remained in the vicinity from the 12th to the 15th, and a large swarm—probably the same—reappeared on the 24th. A swarm was reported at Thornybush on the 10th; this arrived at Maritzburg on the 18th, and remained in the environs of the City until the 24th. Until the middle of the month swarms were reported from Krantzkop. In some of these fungus disease was still prevalent, and the swarms were noted to be travelling Coastwards. Victoria County is not very seriously infested; there appear to be several swarms about Mapumulo, Kearsney, Stanger, and inland from Tongaat. These were circling about until the middle of the month. Since then no reports have reached me.

From Zululand, the reports are also meagre, with the exception of the Entonjaneni Division. Here it would appear that a number of swarms are hybernating in the Umfolozi and Umhlatuzi Valleys. There are also swarms in the neighbourhood of the Nkandhla, and along the Coast from Somkele to Inyoni. Early in the month numerous swarms were reported about Hlabisa, but there was a certain amount of freedom from the pest until the 19th, when a huge swarm, 5 by 30 miles in extent, was reported to be flying N.E. A very large swarm arrived at Eshowe on the 16th from the west and departed, travelling S.E., on the 17th. This swarm is probably identical with one observed at Krantzkop the day before, and on the 19th at Hlabisa.

As a matter of interest, it may be pointed out that two correspondents report that the swarms in their vicinity go down to the river for the day, returning to the hill-sides at night—probably attracted by the warmth radiating from the krantzes.

The fungus disease has now lost all its virulence, little or no mention of it being made in reports dated subsequent to the first week of the month.

A NEW COTTON TROUBLE.

During June, Mr. John Kirkman, M.L.A., submitted a large collection of diseased cotton bolls representative of the whole of his crop at Umzinto.

Appended is my report to Mr. Kirkman. However, since that was written a survey of Mr. Kirkman's and Mr. Thompson's cotton fields has been made, and I am now inclined to alter the view therein expressed that an insect has been the primary factor in the destruction of the crop. There is, of course, no doubt in my mind concerning the devastating effect of the insect nor that its attack on the bolls is followed by fungus decay of the tissue; but there is abundant evidence that a rot, quite apart from the insect's attack, has developed and played the most important part in the destruction of the bolls. The exact nature and causation of this disease is not at present clear; but, from the evidence before me, it appears to have been brought about by uncongenial weather conditions.

It may be explained that Mr. Kirkman's and Mr. Thompson's fields lie about four miles apart and are separated by a range of hills. In one case the disease and the insect are predominant, in the other both are rare. At both the growth of the plants has been excellent. Mr. Kirkman will not, I understand, gather more than 20 per cent. of his crop, whilst Mr. Thompson's is very satisfactory. Already a large amount has been harvested, and the yield of lint cotton from the 18 acres gives promise of figuring out between £200 and £270.

At Mr. Kirkman's there is a considerable amount of indigenous bush in close proximity to the plantations; this, I am of opinion, accounts largely for the gravity of the insect attack, because at Mr. Thompson's there is no bush at all. Further, I learn that Mr. Kirkman planted earlier than Mr. Thompson; this circumstance, connected with the fact that throughout March and April continuous rains fell, is sufficient in itself to account for the development of the disease, because the bolls which should have opened in March, through the lack of sunshine, did not open until the middle of May.

Copy of Report to Mr. Kirkman.

This report is based upon an examination of about 150 bolls selected at random from amongst the consignment reaching me on the 26th June. Of this lot 100 were critically examined. The bolls are in various stages of growth, and, with but two exceptions, all those examined were unsound internally.

Upon a few I have noticed a superficial fungus parasite, but this has no connection with the trouble with which the bolls are assailed.

A casual examination of the bolls (50) showed at once that a considerable number were infested by a caterpillar, and the contents of all were seen to be suffering from fungus attack. At the first glance, the trouble seemed to be a form of "boll rot" accompanied by insect attack, but, having made a very careful examination I arrived at the conclusion that the trouble is due to the insect as the primary factor, and the decay to saphrophytic organisms following the attack of the insect.

Of the hundred bolls critically examined, 80 contained caterpillars. As a general rule there is but one caterpillar in each boll, but occasionally two and three are met with. These insects feed within the seeds, and it is not until they are reaching full growth that they make galleries in the boll. When nearly full grown they bore a hole through the capsule of the boll so as to provide a means of exit for themselves when moths. In the majority of cases coming under observation the caterpillars were found ensconced in a seed, the only indication of their presence being the discoloured and decaying appearance of the fibre about the seed.

There is no indication of the presence of an insect in the boll up to a certain stage in the caterpillar's development.

The 20 diseased bolls in which I was unable to find insects may be suffering from boll rot, and if this is so then the two troubles are concurrent. However, it is possible that the disease has been set up by punctures made by other insects (plant-bugs).

It is only right to say there is a possibility that the bolls are suffering from rot quite apart from the caterpillar attack, but it is more reasonable to assume that the decay is due to organisms (moulds, and perhaps bacteria) which have gained an entrance to the tissue subsequent to the attack of the insect. I find that, before the caterpillar comes to maturity, the whole boll becomes decayed throughout, and this state of affairs does not interfere with its development.

It is not always usual for these disturbed conditions to follow such cases of insect attack, and when they do and the insect flourishes amongst the decayed tissues, it rather tends to support the argument that the decay is secondary. For example, ordinary fruit fly maggots, when developing in oranges, often set up so much decay and fermentation that they themselves are destroyed by the conditions that they have brought about; on the other hand, the Carpocapsa caterpillar of the orange and naartje sets up decay very rapidly in oranges, but this condition is never inimical to the complete development of the caterpillar.

It is of importance to add that the caterpillars pupate in the bolls, so that the destruction of all that are infested is a most important measure of control.

It seems reasonable to anticipate that the best preventive means at our disposal will be found in spraying with a poison fungicide, but until further data are obtained as to the exact manner of oviposition no definite statement can be made on this point.

BIRDS, PETS AND PESTS.

As I have several times had occasion to draw attention to the danger attendant upon the casual introduction of small animals, particularly birds—more especially with reference to the acclimatization of that greatest of bird pests, the English sparrow—now going on in Durban, it is somewhat interesting to notice the results which have attended the sentimental introduction of such creatures into other countries.

According to a Bulletin recently published by the New Zealand Government, the acclimatization in that country of small foreign birds has upon the whole proved a mistake. Virtually all that have been brought into that Colony are now proving themselves nuisances to the farmer and fruit-grower.

The following are described as "unmitigated pests":—Sparrows, greenfinches, blackbirds, thrushes and larks, the last-mentioned being credited with doing enormous damage to young wheat. Despite the fact that so much evil has already been accomplished, it appears that a great many people in New Zealand are now asking for an embargo upon the further introduction, upon any account, of foreign birds.

THE GIPSY MOTH IN AMERICA.

The ease with which the dissemination of insect and other pests may be effected is little realised by the average farmer or fruit-farmer; and still less is anticipated the trouble attendant upon individual—and even upon organised—efforts to eradicate the pest when once it has established a tolerably firm foothold.

A striking instance of this is afforded by the case of the Gipsy Moth (*Porthetria dispar*, L.) in the United States, related in a recent "Farmers' Bulletin" issued by the U.S. Department of Agriculture. In 1869, Prof. Leopold Trouvelot, who was connected with the astronomical observatory at Harvard University, occupied himself at odd times, for his own pleasure and interest, in the study of wild silkworms, with the idea that species of commercial value might be found and that perhaps something might be done in the way of cross-breeding to produce a hardier insect than the silkworm of commerce, and one which, perhaps, might prove to be resistant to the pebrine disease what at that time was playing havoc in the silkworm establishments of Europe. He imported different silk-spinning caterpillars in various stages of existence, and, among others, egg-clusters of the gipsy moth. He lived at Medford; and raised caterpillars on a shrub in his yard, enclosing them with netting. During a gale the net was torn and the insects scattered. He searched for them, and destroyed those found; he also gave notice of the probable escape of the species, but the affair was soon forgotten. For many years the insect was not noticed by the people of Medford, and it probably increased very slowly. It is supposed that it was gradually accommodating itself to the climate, and it is known that the neighbourhood abounded with insectivorous birds and that adjoining woods were frequently burned over. Eventually the insect became noticeable, and by the summer of 1889 had multiplied to such an extent as to become a notorious pest. Then for the first time specimens were sent to the State Agricultural

Experiment Station at Amherst and determined by Dr. H. T. Fernald as the well-known gipsy-moth of Europe.

The town of Medford raised a sum of money to fight the insect, and in the spring of 1890 the State appropriated £5,200, a corresponding amount being, in addition, appropriated early in June. Other appropriations followed from year to year with gradually increasing amounts. The last appropriation was expended in 1899, and the legislature refused to vote further sums for 1900 and the following years. In 1905 the appropriations were renewed, and the work has since been carried on under a well-founded State law. Although appealed to on several occasions, the National Government took no steps to assist the State of Massachusetts in its fight against the gipsy-moth—with the exception of a small appropriation made in 1905 for the purpose of introducing its natural enemies—until last year. Congress then voted a sum equivalent to approximately £17,200, to be expended by the Secretary of Agriculture, through the Bureau of Entomology, for the purpose of preventing further spread of the gipsy moth and the brown-tailed moth; and active work is now going on under this appropriation.

The need for a certain amount of State control in order to prevent the introduction and dissemination of harmful insects and other pests is, from this instance above, apparent. Such a pest may be likened to a grass fire. It is very easy to start, either voluntarily or otherwise; and at first it will do no harm. At the start it is very easy to put out; but the longer it is left to burn on, the greater will be the amount of effort required to be expended to put it out.

H. J. C.

The Durban Show.

THE success that attended the efforts of the Royal Agricultural Society in the organisation of its Show last month was also experienced by the Durban and Coast Society of Agriculture and Industry during the current month; though in both cases the full measure of interest was wanting by reason of the enforced absence of entries in the cattle classes.

On the 18th, 19th and 20th of July, in the midst of a successful "season" with the town full of visitors from other parts of Natal and from the Transvaal, O.R.C., Cape Colony, and other parts of South Africa, the Durban and Coast Society held its Show in Durban. Though not entirely of a favourable nature, the weather was sufficiently clear to permit of the attendance of thousands of visitors, which attendance swelled to great proportions on the afternoons of Friday and Saturday, the 18th and 19th.

The exhibits in practically all classes were excellent, and again testified—as in the case of the Maritzburg and other Shows—to the possibilities this Colony possesses in the direction of agricultural and industrial development. Of particular interest, perhaps, at the present juncture, were the exhibits of cotton by Mr. J. Kirkman, M.L.A., and of various other fibres, by Messrs. Wm. Cotts & Co. With the cotton (which consisted of several bales, and comprised both ginned and unginned cotton) was exhibited a small, hand-power gin, which undoubtedly proved of interest to many who are contemplating the cultivation of cotton. All our staple industries and crops were well represented, as well as a host of minor ones, many of them of promise. The interesting exhibit of the Natal Oil and Soap Co., consisting of a great pyramid of soap set on a groundwork of soap shavings and surrounded by a low wall of soap, attracted much attention from townspeople and farmers alike. To farmers this new industry is of peculiar interest, affording as it does promise of an extensive market in the near future for earth nuts, castor oil beans, and the sundry other vegetable oil products that do so well in various parts of the Colony. At present there is no market worth speaking of for these products, and the prospect of a ready sale for all that can be produced should prove a stimulant to the cultivation of such plants. Jams, jellies, and bottled fruits were represented in extensive variety; and other confectionery, such as biscuits and cakes, compared well with the imported article.

Space prevents the examination of even a portion of the many exhibits of interest, either in the purely agricultural, live stock, or industrial sections; but those responsible for the organisation of the Show may be congratulated upon the success which has attended their efforts. If the Durban and Maritzburg Shows have done nothing else, they have brought before the people of those towns many industries the existence of which they were probably formerly unaware; and they have shown the steady progress the Colony is making towards a time when it will be not only self-supporting, but will also be in a position to export an increasing surplus production. There unfortunately exists an unreasonable disdain for everything "Colonial": tea, sugar, coffee, jams, sweets and other confectionery, and soap (to mention a few of our products) produced in the Colony cannot possibly compare with imported stuff (no matter where the imported article hails from!) in the eyes of many people, and so money is sent out of the Colony and local industries have to struggle against adverse circumstances and depend upon the demand in other parts of South Africa.

Natal Agricultural Statistics.

RESULTS FOR THE SEASON 1905-6.

AFTER considerable delay, occasioned by various staff changes and by pressure of work, the compilation of the agricultural statistics of the Colony for the year ended 30th January, 1906, has now been completed, and the results, so far as European farming is concerned, are set out in the tables that follow. The totals for each of the Magisterial Divisions will appear in the Statistical Year-Book to be published shortly.

I.—LAND CULTIVATED BY EUROPEANS.

Nature of Crop and Number of Acres of Land in each Crop reaped during the Year.

Description.	NATAL.			ZULULAND.		Whole Colony.
	Coast. acres	Midland. acres	Upland. acres	Coast. acres	Inland. acres	acres
Total Number of Acres Cultivated	89,884¾	146,012	81,269½	1,151¾	3,455	321,773
Aloes	85½	51	7	...	...	143½
Amadumbe *(Colocasia)* ...	56	19	18½	37¾	1	132¼
Arrowroot	28½	6	1½	...	...	36
Barley for Grain	8	88¾	457	...	1½	555¼
Beans	355	1,024¾	254½	13	2¾	1,650
Buckwheat	10	92	235½	..	...	337½
Cayenne Pepper	16¼	...	1	...	...	17¼
Coffee	115¾	5¼	...	...	...	121
Cotton	146½	49¼	1	15	...	211¾
Earth Nuts	24¼	25½	58	1¼	...	109
Exotic Grasses	54½	1,260¼	1,889	...	1	3,204¾
Green Crops for Fodder :—						
Barley	9½	693½	1,313½	...	5	2,021½
Millet	7	930½	1,433¾	...	14	2,385¼
Oats	15½	2,860	3,238	...	...	6,113½
Sugar Cane	241¼	869¾	195	¾	...	1,306¾
Other Green Crops ...	4½	1,029½	589¾	...	12	1,635¾
Hay	4	516	1,483	...	...	2,003
Kafir Corn	78	3,234½	3,959¼	19	2¼	7,293
Lucerne	45¾	68	400¼	...	1½	515½
Mangolds	20½	34¾	39¾	...	...	95
Mealies	6,419	58.832½	45.086½	363½	1,785	112.486½
Millet for Grain	1	158½	225¾	½	...	385¾
Oats for Grain	...	90¼	885¼	...	...	975½
Onions	1	45	88¼	...	...	134½
Orchards	29,610	1,222¼	2,851½	70	32	33,785¾
Peas	10¼	124	191½	...	...	325¾
Potatoes	437¼	2,131½	2,973½	15¾	11¾	5,569¾

ROYAL AGRICULTURAL SHOW.
First Prize Merino Ram.
Exhibited by Mr P. Otto, J.P.

I.—LAND CULTIVATED BY EUROPEANS.—*Continued.*

Nature of Crop and Number of Acres of Land in each Crop reaped during the Year.

Description.	NATAL.			ZULULAND.		Whole Colony.
	Coast. acres	Midland. acres	Upland. acres	Coast. acres	Inland. acres	acres
Pumpkins	245½	480¾	644	7	5	1,382¼
Sugar Cane—Total area under Crop	40,298	42	31	533	...	40,904
Sugar Cane cut during 1905-6 ...	10.849	8½	22	...	...	10,879½
Sunflower	44¼	54½	90¼	2½	...	191½
Sweet Potatoes	700	417	240¼	29¾	54	1 441
Tea	4,282	4¾	...	...	...	4.286¾
Tobacco	71	138¾	247¼	1	6¼	464¼
Turnips and Swedes ...	8	477¼	890¼	...		1 375½
Vegetables	83	191	92¼	2	...	368¼
Wattles—Total area under cultivation	6,316	66.471	5,456	40	1,520	79,803
Wattles planted during 1905-6...	1,366	8,104¾	1,169	...	312	10,951¾
Wheat	1	259	368	...	...	628
Winter Fodder—Area set aside for	12	1,867½	5,132¼	...	...	7.011¾
Other Crops	19¼	145¾	200½	...	...	365½
Irrigated Land	161	15,942¼	7,413	2	53	23,571¼

II.—CROPS REAPED BY EUROPEANS.

Nature of Crop and Quantity or Value of Produce obtained.

Description.	NATAL.			ZULULAND.		Whole Colony.
	Coast.	Midland.	Upland.	Coast.	Inland.	
Aloes (fibre , tons	...	...	22	...	...	22
Amadumbe *(Colocasia)*, muids	4,106	233	359	537	13	5.248
Arrowroot, cwt.	204	49	...	...	...	253
Barley (grain), muids ...	35	764	704	...	...	1,503
Beans, muids	801	3,733	778	81	2	5,395
Buckwheat, muids	30	233	693	...	...	956
Cayenne Pepper, lbs. ...	7.304	10	300	...	...	7,614
Coffee, lbs.	31,142	10	...	..	...	31.152
Cotton, lbs.	19,480	235	...	150	...	19.865
Earth Nuts, muids	255	504	134	28	...	921
Ensilage, tons	60	2.493	1 060	...	...	3,613
Exotic Grasses, tons ...	...	227	278	...	...	505
Fruit Sold, £	15,557	2.211	3.051	2	...	20 821
Fruit, Canned, £	90	322	1 664	...	...	2,076
Fruit made into Jams & Jellies, £	32	476	837	...	...	1,345
Green Crops for Fodder :—						
Barley, tons	...	999	1.838	...	...	2,837
Millet, tons	6	912	2 240	...	...	3,158
Oats, tons	10	5.475	2 894	...	...	8,379
Sugar Cane, tons ...	801	7,206	124	11	...	8,142
Other Green Crops, tons ..	32	1.394	527	...	2	1,955

II.—CROPS REAPED BY EUROPEANS.—*Continued.*

Nature of Crop and Quantity or Value of Produce obtained.

Description.	NATAL.			ZULULAND.		Whole Colony.
	Coast.	Midland.	Upland.	Coast.	Inland.	
Hay (veld), tons	292	10,370	7,708	...	43	18,413
Hay (meadow), tons	...	101	1,427	...	...	1,528
Kafir Corn, muids	198	6,409	20,458	65	12	27,142
Lucerne, tons	50	276	162	...	1	489
Mangolds, tons	·2	340	298	...	...	640
Mealies, muids	36,721	304,901	217,196	1,220	8,003	568,041
Millet (grain), muids	90	917	441	1	...	1,449
Oats (grain), muids	...	335	1,878	...	...	2,213
Onions, muids	...	1.560	4,196	...	...	5,756
Peas, muids	37	541	429	...	...	1,007
Potatoes, muids	10,822	59,286	67,404	130	88	137,730
Pumpkins, grown among mealies, tons	65	3,249	1,699	7	6	5,026
Pumpkins, grown separately, tons	166	375	417	...	...	958
Sugar, tons	116,002	6	...	...	...	116,008
Molasses, etc., lbs.	2,701,240	...	...	...	...	2,701.240
Sunflower Seeds, muids	500	369	300	7	...	1,176
Sweet Potatoes, muids	19,689	16,205	1,440	873	86	38 284
Tea, lbs.	1,508.408	12	35	...	...	1,508 455
Tobacco, lbs.	44,534	43,343	126 875	2,010	1,208	217,970
Timber Sold, £	245	2,865	5.059	...	30	8,199
Turnips and Swedes, tons	42	6,374	4,406	...	...	10 822
Vegetables Sold, £	957	1,146	1,418	21	...	3,542
Wattle Bark, tons	640	9,982	1,002	...	107	11.731
Wattle Timber Sold, £	125	12,395	959	...	84	13,563
Wheat, muids	...	722	1,837	...	...	2,559

III.—AVERAGE YIELDS OF CROPS.

Nature of Crop and Average Yield obtained per Acre in each Crop.

Description.	NATAL.			ZULULAND.		Whole Colony.
	Coast.	Midland.	Upland.	Coast.	Inland.	
Barley (grain), muids	..	7·3	5·2	...	...	5 8
Barley (forage), tons	...	3·0	2·3	...	...	2·8
Beans, muids	3·5	3·3	3·7	2·8	4·0	3·6
Buckwheat, muids	...	4·6	4·0	...	...	4·3
Hay, tons	...	1·5	1·9	...	...	1·8
Kafir Corn, muids	5·7	4·0	5·1	5·4	5·0	4·9
Mangolds, tons	5·0	10·9	10·0	...	...	9·4
Mealies, muids	6·2	5·6	5·2	3·3	3·4	5·5
Millet (grain). muids	...	4·4	5·5	2·0	5·0	5·5
Millet (forage), tons	...	2·0	2·5	...	...	2·3
Oats (grain), muids	...	5 9	4·5	...	...	8·1
Oats (forage), tons	1·0	1·6	1·6	...	...	1·6
Onions muids	...	40·0	63·8	...	...	50·4

III.—AVERAGE YIELD OF CROPS.—*Continued.*

Nature of Crop and Average Yield obtained per Acre in each Crop.

Description.	NATAL.			ZULULAND.		Whole Colony.
	Coast.	Midland.	Upland.	Coast.	Inland.	
Peas, muids	2·3	3·4	4·9	...	...	4·3
Potatoes, muids	36·5	29·4	28·4	12·8	12·6	28·4
Pumpkins, tons	2·3	2·3	2·8	4·3	...	2·7
Sugar, tons	1·7	...	...	...	...	1·7
Sunflower, muids ...	6·1	3·4	5·2	6·0	...	5·0
Sweet Potatoes, muids ...	40·6	31·2	22·5	35·7	20·0	31·0
Tea, lbs....	661	...	...	...	...	661
Tobacco, lbs.	1,374	586	465	2,000	1,040	837
Turnips, tons	7·0	9·8	4·1	...	...	7·5
Wattle Bark, tons	4·5	5·5	...	...	4·0	5·4
Wheat, muids	...	9·9	4·3	...	...	5·9

IV.—AGRICULTURAL IMPLEMENTS AND MACHINERY.

Return of Agricultural Implements, Machinery, and other Accessories in possession of Europeans on August 31, 1905.

Description.	NATAL.			ZULULAND.		Whole Colony.
	Coast.	Midland.	Upland.	Coast.	Inland,	
Baling Machines	522	208	241	...	...	971
Carts	808	665	819	21	28	2,341
Wagons	394	1,167	1,312	43	59	2,975
Chaff Cutters	134	557	322	1	2	1,016
Cream Separators	35	523	349	2	1	910
Cultivators, Horse-hoes, etc. ...	287	2,600	1,602	5	15	4,509
Dipping Tanks—Cattle ...	22	57	21	...	3	103
,, ,, Sheep ...	5	118	213	...	...	336
Engines and Turbines ...	124	98	117	...	3	342
Harrows...	274	1,688	1,700	30	38	3,730
Hay Rakes	18	460	330	...	8	816
Hydraulic Rams	12	87	42	...	1	142
Incubators	31	128	132	1	1	293
Mealie Mills	269	706	1,061	18	29	2,083
Mealie Planters	37	414	405	1	12	869
Mealie Shellers	176	906	880	13	14	1,989
Mowing Machines	38	592	462	1	7	1,100
Ploughs	822	3,732	3,957	102	74	8,687
Potato Planters	4	33	57	...	...	94
Reapers	3	48	72	...	...	123
Silos	9	22	10	...	...	41
Windmills	17	80	22	1	...	120
Winnowers	40	237	160	1	4	442
Other Implements	27	121	108	1	...	257

V.—LIVE STOCK

Live Stock in possession of Europeans on August 31, 1905.

Description.	NATAL.			ZULULAND.		Whole Colony.
	Coast.	Midland.	Upland.	Coast.	Inland.	
Stallions. imported	2	45	66	..	...	113
Stallions, Colonial	18	244	385	3	2	652
Brood Mares	36	3.050	5.857	3	46	8,992
Saddle Horses	1,965	2,848	4.027	38	59	8,937
Other Horses	522	2,868	5 777	5	17	9,189
Horses Sold during 1905-6 ...	54	962	1,309	2	13	2.340
Mules	908	165	577	1	55	1,706
Donkeys	539	499	684	14	23	1,759
Bulls, imported	24	44	55	1	3	127
Bulls Colonial	274	1,610	1 936	65	37	3,922
Cows	4.363	34,764	33,803	602	561	74 093
Oxen	7,196	28,169	29,394	890	981	66 630
Other Cattle	3,791	35,253	48,488	956	597	89,085
Cattle Sold during 1905-6 ...	801	7.592	10,789	226	160	19.568
Cattle available for slaughter ...	192	3.048	5 310	70	125	8,745
Rams, imported	...	130	195	...	2	327
Rams. Colonial	3	2,809	5.155	5	18	7,990
Sheep, Wooled	90	153.882	369.069	...	1,371	524,412
Kafir Sheep	261	8,702	39,440	558	1,055	50.016
Persian Sheep	7	2,994	13,899	...	...	16 900
Sheep Sold during 1905-6 ...	30	18,263	35,199	336	...	53.828
Sheep available for slaughter ...	...	10,372	26,644	...	...	37 016
Angora Rams, imported ...	...	157	34	...	...	191
Angora Rams, Colonial ...	...	69	1 090	4	6	1,169
Angora Goats	81	2.983	74,552	...	120	77.736
Kafir Goats	1.567	5.744	30,704	580	736	39.331
Goats Sold during 1905-6 ...	415	1.510	10,974	449	19	13 367
Pigeons	2 248	2.577	2 253	337	60	10.475
Boars. imported	10	19	17	2	2	50
Boars, Colonial	122	502	758	17	27	1,426
Sows	702	2.255	2 582	114	66	5,719
Other Pigs	2,457	7 678	5.768	243	96	16.242
Pigs Sold during 1905-6 ...	986	6 472	4 037	86	...	11.581
Pigs available for slaughter ...	797	4.027	2 278	150	2	7,254
Fowls	49,391	84,233	84,464	2,640	1,970	222,698
Ducks and Geese	3 464	6.610	1.432	142	384	12 032
Turkeys	393	2 164	4.533	15	94	7,199
Guinea-fowls	2 256	11,778	4 627	...	8	18.669
Poultry Sold during 1905-6 ...	2,691	10,675	13,423	330	50	27.169
Rabbits	1,447	657	422	72	...	2,598
Ostriches	1	449	4	...	...	454
Bee Hives	283	598	318	7	...	1,206

VI.—ANIMAL PRODUCTS.

Nature and Quantity or Value of Animal Products turned out during the Year.

Description.	NATAL.			ZULULAND.		Whole Colony.
	Coast.	Midland.	Upland.	Coast.	Inland.	
Bacon and Hams, lbs. ...	21,386	164,652	143,854	886	4,061	334 839
Brawn, lbs.	110	2,400	933	...	...	3 443
Hides, Horns, and Hoofs, £ ...	643	363½	960½	...	...	1 967
Lard, lbs.	3,283	19,510	24,361	100	242	47,496
Meat, other than Pork, lbs. ...	9 840	20,784	111,445	800	50	142.919
Pork, lbs.	18,011	55,222	51,734	450	...	125,417
Tallow, cwts.	1.333	955¼	26¼	...	...	2.314½
*Butter Sold, other than to Creameries, lbs ...	15,274	169,269	202.716	2,275	3,492	393.026
†Cheese, lbs.	720	1,650	10,490	...	...	12,860
‖Milk Sold other than to Creameries, lbs. ...	15,450	63,647	49,738	1,315	...	130,150
‡Eggs, dozens	39,634	126,266	91,378	772	3,403	261,453
Honey, lbs.	752	4.521	3.241	...	...	8,514
Ostrich Feathers, £ ...	...	560	30	...	...	590
Mohair, lbs.	...	57,006	151.608	...	360	208.974
Wool, lbs.	475	572.943	1.306,897	...	4,300	1.884 615

VII.—FARM LABOUR.

Numbers of Europeans, Natives, and Indians employed, with Average Wages paid to Natives.

Description.	NATAL.			ZULULAND.		Whole Colony.
	Coast.	Midland.	Upland.	Coast.	Inland.	
European Farm Hands ...	178	124	170	6	1	479
Natives—						
Men	2,098	6,437	5,090	317	368	14,310
Women	267	884	2,201	27	47	3,426
Indians, Free—						
Men	832	242	140	18	3	1,235
Women	110	35	22	3	...	170
Indians, Indentured—						
Men	7,307	2,011	873	151	3	10,345
Women	3,330	398	169	54	...	3,951
Average Wages paid per Mensem to Natives—	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Men	19 7	15 10	11 6	17 6	13 6	15 7
Women	7 6	9 10	5 6	3 9	7 0	6 8

* Approximately 300,000 lbs. of Butter were, in addition, manufactured by Creameries.

† Approximately 25,000 lbs. of Cheese were, in addition, manufactured by Creameries.

‖ Approximately 500,000 gallons of Milk were, in addition, sold by Creameries.

‡ Approximately, 100,000 dozen eggs were, in, addition, sold by Creameries.

Landbouw Co-Operatie.

Door E. T. Mullens, Secretaris, Landbouw Ministerie.

Dit artikel is opgesteld met het doel om de vraag te beantwoorden: Welke is de beste vorm van Landbouw Co-operatie voor Natal? Ten einde tot een antwoord tot deze vraag geraken is het, in de eerste plaats, noodig om na te gaan wat in andere landen gedaan is, opdat de fouten door de pioniers der beweging begaan niet in deze Kolonie herhaald zullen worden, en opdat wij ons voordeel kunnen doen uit de opgehoopte ondervinding thans beschikbaar.

Denemarken wordt erkend door allen die de zaak onderzocht hebben als verre weg voor alle andere landen ten opzichte van landbouw cooperatie; en eene korte beschrijving van wat aldaar gedaan is zal een goed begrip geven van de zeer groote voordeelen—inderdaad de omwenteling—te weeg gebracht door landbouw co-operatie. Als een gevolg van de verschillende Europeesche oorlogen, was Denemarken, uit een landbouw oogpunt, zoo te zeggen geruineerd, daar het, buiten de gewone verwoesting veroorzaakt door de oorlogen, beroofd werd van de beste landbouw gronden en tot nauwe limieten beperkt werd. Van deze beperkte oppervlakte bestond een heel groote deel uit vlei land en zandduinen—schijnlijk tot niets anders geschikt dan het woeden van winden en stormen daarover. Met het doel om het land te herstellen werd het Deensche Heide Genootschap opgericht in 1866. Paden werden gemaakt, besproeiings schema's ten uitvoer gebracht, Kolonies angelegd, spoorwegen gebouwd, en plantages aangeplant, de finale uitslag van des Genootschaps werkzaamheden zijnde dat 25,000 akkers zand grond in vruchtbare streken veranderd werden en 75,000 akkers beplant werden met kegelvormige boomen, twee proef stations werden daargesteld en 400 model plaatsen georganiseerd werden in alle deelen van het land waar heide te vinden was. Later werden pogingen aangewend door andere genootschappen om de zuivel nijverheid te verbeteren, en in verband daarmede werd de pluimvee en varken teelt bij de hand genomen. Daar de zuivelboerderij zich ontwikkelde en Engeland de voornaamste markt voor Denemarken werd, heeft het Deensche Gouvernement deskundigen naar Ierland afgevaardigd om onderzoek te doen naar de methoden van de teelt en voeding destijds in zwang om de kwaliteit van varkens te produceeren, die door het Iersche Spekbereidings Genootschap vereischt werd. Varkens werden uit Ierland in Denemarken ingevoerd en, tengevolge van de co-operatieve beweging, werd er zooveel voortgang met de ham en spek nijverheid gemaakt dat Denemarken zoo te zeggen er in slaagde de Iersche ham en spek industrie uit de Enelsche markt te verdrijven. Als een gevolg van pogingen aangewend door Sir Horace Plunkett om de landbouw in Ierland te herstellen, werd een Iersch Landbouw Department gevormd en, in 1903, werd, op verzoek van het Landbouw Departement, eene deputatie vertegenwoordigende de Iersche Landbouw Industrie, op haar beurt naar Denemarken gezonden om rapport te doen omtrent de wijze van de spek bereiding in gemeld land en om te probeeren uitvinden welke methoden door de Deensche boeren en kooplieden gevolgd worden waardoor zij zoo goed slaagden om co-operatieve ham en spek fabrieken voor hun gedurig toenemenden handel op te richten. Het kostelijke rapport op "Co-operatieve Genootschappen en de landbouw condities in Denemarken" door de leden dezer deputatie gedaan, schreef het geheele succes der Deensche boeren toe aan co-operatie. De indruk op de leden der deputie en op de ambtenaren van het Iersche Landbouw Departement gemaakt door hun onderzoek was zoo treffend dat er dadelijk maatregels genomen werden om de landbouw industrie van Ierland te organiseeren op dezelfde voet, met het gevolg dat op zijn beurt is Ierland vooruitgegaan. De aanwas van de co-operatieve spekbereiding in Denemarken van af 1888, toen men eigenlijk een begin ermee maakte, tot 1902 was volgens de deputatie als volgt:—

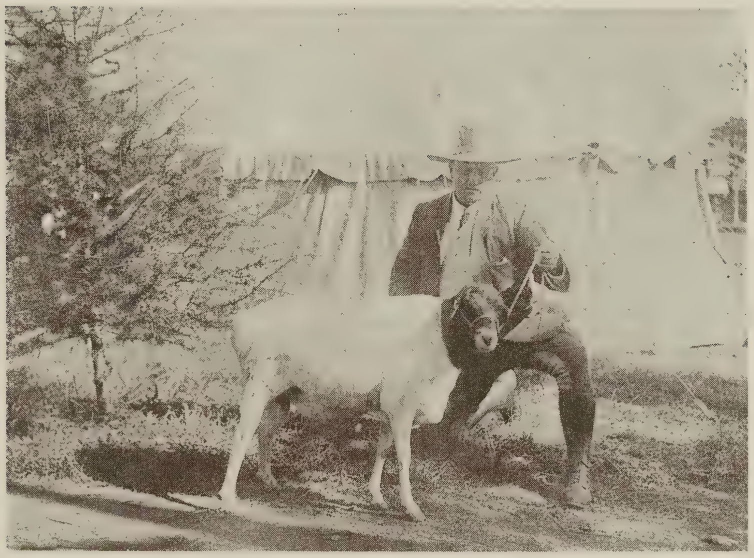
	Aantal fabrieken.	Aantal Varkens gedood.	Waarde.	Gemiddeld prijs per varken.
1888	1	23,407	£57,000	£2 9 0
1902	27	777,232	£2,500,000	£3 4 6

Dus zal gezien worden, wat alleen deze eene nijverheid betreft, hoe enorm de vooruitgang was die door co-operatie teweeg gebracht werd, en het belangrijk feit valt in het oog dat, hoewel het aantal varkens zoo enorm toegenomen was, de gemiddelde prijs per varken gestegen had van £2 9s. tot £3 4s. 6d. De toeneming van den gemiddelden prijs per varken was opklimmend van jaar tot jaar.

De eerste co-operatieve zuivelzaak werd in West Jutland in 1882 geopend en in 1902 waren er niet minder dan 1050 zoodanige zuivelzaken in Denemarken met een tedental van 148,000 die 750,000 koeien hadden uit een totaal van 1,067,000 melkkoeien in het geheele land. In 1902 voerde Denemarken uit, hoofdzakelijk naar Groot Brittanje 135 millioen ponden boter en het bedrag belegd in de oprichting en toerusting van de zuivel zaken was ruim £1,500,000. Op een feit in verband met deze enorme ontwikkeling in Denemarken moet vooral gelet worden, wat de condities in Natal betreft, namelijk dat *het initiatief steeds van de menschen zelf gekomen is.* De neiging in Denemarken is niet alleen geweest slechts de joorlijksche opbrengst te vermeerderen, maar om de kwaliteit van het produkt zelf te verbeteren—zoo zeer is dit het geval dat de boeren van Denemarken onderwerpen zich vrijwillig aan zulke strenge restricties door hunne eigen co-operatieve genootschappen opgelegd, als gewis onze zuivel industrie de doodsteek zouden geven als dergelijke restricties in Natal toegepast zouden worden. Regels worden door de Co-operatieve Melkerijen neergelegd waardoor de eigenaars van koeien gebonden worden om aan de Melkerij te leveren, voor een tijdperk van tien jaren, de melk van al de melkkoeien, welke de boeren ten eenigen tijd in hun bezit mogen hebben—met uitzondering alleen van de melk noodig voor huisgezinnen, d.w.z. voor het gebruik van hun eigen en van andere huisgezinnen in hunne eigen distrikten. Als eenig lid zich wil onttrekken aan de Melkerij voor de eerste tien jaren om zijn, moet hij een boete betalen op iedere koe alzoo onttrokken. De melk moet in een reine en onvervalschte conditie geleverd worden, zonder eenige onaangename smaak. De leden zijn verplicht de melk koel te houden als het niet dadelijk afgehaald wordt na het melken plaats gehad heeft. Als twee maal gemelkt wordt moet het niet door elkaar gegooid worden. De melk van eene pas gekalfde koe mag niet aan de Zuivel zaak geleverd worden voor drie dagen verloopen zijn. De melk van eene koe lijdende aan eenige ziekte mag slechts geleverd worden op vertooning van een certificaat van een Veearts. In geval een aanstekelijke ziekte uitbreekt, mag geen melk van een alzoo besmette plaats geleverd worden. Melk die zuur of vervalscht is of bij de Roomerij komt in kannen niet heelemaal schoon wordt geweigerd. Regels zijn neergelegd omtrent de hoeveelheid voer te worden gegeven aan elke koe in den winter, en, gebeurt het dat zeker soort voer de kwaliteit der boter bij de Roomerij benadeelt, heeft het Comite het recht te eischen dat gemeld voer niet meer gebruikt zal worden. Niettegenstaande deze en andere strenge restricties, is het allerbelangrijkst kenmerk in elke co-operatieve zaak in Denemarken de buitengewone getrouwheid aan hun eigen instellingen van de menschen die er deelhebbers van zijn.

Denemarken is niet het eenige land waar de meuschen zich vrijwillig onderwerpen aan de restricties hen opgelegd door hunne eigen co-operatieve genootschappen. In Noord Holland hebben de markt tuiniers zich in co-operatieve genootschappen gevormd die ook op een buitengemeen practische voet bestuurd worden. Het goed der leden wordt geinspecteerd, voor het te koop geboden wordt, door ambtenaren door de genootschappen zelf benoemd voor het doel, en eenige beschouwd beneden het vereischte gehalte wordt geweigerd, terwijl aan het andere dat aangenomen wordt een etiket dragende het geregisteerd handelsmerk van het genootschap gevestigd wordt. Ook zorgt men dat de bezendingen de behoorlijk opgegeven maat hebben en dat zij behoorlijk verpakt zijn. De alsoo goedgekeurde produkten worden te koop geboden op de markt van het genootschap, de marktmeester zijnde gewoonlijk de president van het plaatselijke genootschap of een tak daarvan.

Als een voorbeeld van wat gedaan kan worden door de boeren in Natal met hunne mielie oogsten, kan ik het geval voorstellen, door den heer Pratt aangehaald, van de boeren in Hongarije. De ondervinding



ROYAL AGRICULTURAL SHOW.
Persian Ram,
Exhibited by Central Experiment Farm, Cedara.

toonde hen dat zoolang elkeen op zijne eigen afzonderlijke krachten in het van de hand zetten van zijn graan steunde, was hij onderworpen aan zekere merkbare nadeelen. Vooral was hij aan de genade van eenig kartel (of ring) van koopers dat zich wilde vormen blootgesteld, want zij wisten dat zelfs wanneer hij in staat was zijn oogst terug te houden totdat de prijzen meer gunstig zouden zijn, het practisch onmogelijk voor een boer was, wonende in districten verwijderd van den spoorweg om zijn oogst tot den winter terug te houden, want dan zou hij het niet aan den spoorweg kunnen brengen wegens den slechten toestand der paden. Om dezen toestand te verijdelen, vormden de boeren in vele districten co-operatieve organisaties om elevators op te richten by "sidings" nabij de meest gelegen spoorweg stations en naar deze elevators zonden de boeren hun koorn om geborgen te worden, de afzonderlijke lotten wordende met de andere gemengd doch in het geheel genomen gevoegd slechts bij soorten van gelijke kwaliteit. Door middel van deze elevators konden de beschikbare voorraden voor geruimen tijd gehouden worden. Niet alleen werd de vorige moeielijkheid om ze bij het spoorweg station te krijgen in den winter te boven gekomen, doch de uiteindelijke verkooping bij de groote maat beteekende het vervoeren van het koorn over den spoorweg in groote hoeveelheden—waardoor en aanzienlijke uitsparing in de vrachtgelden teweeg gebracht werd wanneer vergeleken met wat elke boer zou hebben moeten betalen als ieder zijn eigen bijzonder lot had weg gezonden als een afzonderlijke bezending. Financieele schikkingen werden terzelfder tijd getroffen waardoor de boeren voorschotten van crediet banken kregen op het koorn door hen gestuurd naar de elevator, en met deze voorschotten voorhanden konden zij op de balans wachten tot zoodanigen tijd als de verkooping tot hun voordeel zou uitvallen. Zoo goed heeft deze verdere ontwikkeling van de combinatie der landbouwers beantwoord in Hongarije, dat men een centrale organisatie uitdenkt met het opzettelijk doel om de oprichting van co-operatieve elevators in al de koorn bebouwende districten van het land aan te moedigen en te vergemakkelijken.

Een treffend voorbeeld van wat op eene kleine schaal gedaan kan worden, wordt geleverd door het Muskham (Notts.) Co-operatieve Landbouw Genootschap. In dit dorp werd in 1899 deze organisatie begonnen met zeven leden en een secretaris, en verscheidene maanden verliepen voor het ledental aangroeide. Aandeelen van 5s stuk werden uitgegeven waarop 1s 3d opgeroepen werd. Net voor den oogst van 1899 besloot het genootschap een maai en bind machine voor £32 te koopen (hoewel het opbetaalde kapitaal slechts £15 bedroeg) en de leden kregen een voorschot van de plaatselijke bank door zich gezamenlijk zoowel als ieder afzonderlijk verantwoordelijk voor de terugbetaling te houden. Een schaal van prijzen voor het gebruik van de machine werd opgesteld en de ontvangsten sedert waren voldoende om de leening te betalen zoodat de machine thans het eigendom is van het genootschap, en de verdere ontvangsten daarop zijn, na aftrek van slijtage kosten, zooveel profijt.

Wanneer co-operatie op deze kleine schaal eenmaal ingesteld wordt, blijken de voordeelen daarvan zoo duidelijk dat zij zich speodig uitbreidt en voor andere doeleinden gebruikt wordt.

Het is een hoofdregel bij alle co-operatieve genootschappen, in welk land zij ook gevonden worden, dat de politiek en geloofszaken uitgesloten moeten blijven. Inderdaad, deze co-operatieve societeiten zijn het middel geweest om leden van tegenovergestelde politieke partijen en van verschillende geloven, tusschen wie er vroeger strijd en vijandschap bestonden, op vriendschappelijke voet te brengen. In Belgie en in Italie zijn deze genootschappen krachtig aangemoedigd en gesteund door de Roomsch Katholieke predikanten als een tegengift—en dat een zeer doeltreffend tengengift—tot Socialisme.

Co-operatie kan op tallooze doeleinden toegepast worden, waaronder de aankoop van mesten, aankoop van stoom dorsch machines, verkoop van vee, verkoop van graan, veeteelt, paardenteelt, eierproductie en pluimveeteelt, maken van jam, stoomploegen, vruchten kweeken en verkoopen, molens, verbetering van trekpaarden, uitgeven en bebouwen van kleine perceelen, bijenteelt, vlas, kaas, boter, enz. maken, landbouw nijverheden, aankoop van zaad, aankoop van landbouw gereedschap; en vele co-operatieve genootschappen werden opgericht alleen om de goederen bij de groote maat te vervoeren ten einde het voordeel te genieten van de lagere prijzen voor truckvrachten, zoowel als co-operatie om samen goederen te koopen terzelfde tijd met hetzelfde oogmerk.

De kern van een landbouw genootschap bestaat reeds in elk district van Natal in den vorm van de plaatselijke boeren vereeniging of klub; eenige inlichting die zoodanige boeren vereeniging of klub vereischt, voor een klein co-operatief genootschap in het leven geroepen wordt, kan verkregen worden op aanvraag bij het Landbouw Departement, Maritzburg; en mocht de co-operatie waartoe, zoodanige boeren vereeniging of klub besluit, vorm nemen of eene onderneming worden, waarvoor financieele hulp bij wijze van eene leening voor kapitaal doeleinden vereischt wordt, machtigt de Landbouw Ontginnings Akte van 1904 de Regeering, door middel van de Land Commissie, om het noodige geld voor te schieten. De secties betrekking hebbende op leeningen om landbouwers te helpen co-operatieve zaken daar te stellen zijn als volgt:—

> 56. De Commissie kan, met goedkeuring van den Gouverneur in Rade, landbouwers behulpzaam zijn in de oprichting van fabrieken of dergelijke zaken bedoeld voor het maken van zuivel en boerderij produkten, zooals boter, kaas, en tabak, of het verpakken en bewaren van vruchten, of eenige andere fabrieken voor het beter gebruik maken of verkoopen van rauwe producten.
>
> 57. Geen schema voor eenige zoodanige onderneming zal goedgekeurd worden tenzij het opgericht en voortgezet wordt door eene vereeniging van de soort bekend als een co-operatieve vereeniging, noch voor de constitutie en de

regels van zoodanige vereeniging aan de Commissie onderworpen en door haar goedgekeurd werden.

58. De regulaties onder deze Wet kunnen voorschrijven de voorwaarden waaraan voldaan moet worden voor eenige vereeniging de goedkeuring der Commissie kan erlangen, hetzij ten opzichte van hare samenstelling, lidmaatschap, of verantwoordelijkheden, de distributie der profijten, of eenige andere zaken hoe ook genaamd in verband met hare constitutie.

59. De hulp te worden verleend door het Gouvernement zal zijn bij wijze van eene contributie tot de kapitaal onkosten, en zoodanige contributie zal gemaakt worden op zoodanige termen van betaling, terugbetaling en anderszins als der Commissie behoorlijk voorkomt.

En nu, om de vraag te beantwoorden waarmee dit artikel aanving: "Wat is de beste vorm van landbouw co-operatie voor Natal?" Klaarblijkelijk is het antwoord in 't kort: "Die welke van zelf ontstaat binnen eenig bijzonder district om de bijzondere vereischten dergenen die co-opereeren te gemoet te komen."

Omtrent "hoe te co-opereeren?" moet allereerst de les geleerd worden wat men *niet* moet doen. Verlaat u niet op, en wacht ook niet op het Gouvernement om een co-operatief genootschap voor u in 't leven te roepen, begin er zelf mede, het komt er niet op aan op hoe klein een schaal—inderdaad hoe minder grootsch de doeleinden des te meer waarschijnlijk dat gij zult slagen en dat het u vertrouwen zal imboezemen om later op iets meer ambitieus in te gaan. Wacht niet tot gij allen—of bijna allen—in uw district kunt krijgen om samen te maken; maar maak een begin zoodra er twee of drie van u samen gekomen zijn, in de overtuiging dat zij die terug houden zullen aansluiten, zoodra zij zien dat er werkelijk iets gedaan wordt, om toch niet buiten in de koude gelaten te worden. Onderneem niets vooreerst dat niet gemakkelijk door uzelven beheerd kan worden en waarover gij niet gedurig opzicht kunt houden. Wanneer gij voelt dat gij op de been zijt en geleerd hebt met vastheid langs den weg van co-operatie te wandelen, zult gij u spoedig kunnen wagen op verdere en meer gevaarlijke expedities.

En omtrent "wat te ondernemen" zou ik in de eerste plaats aan de hand geven:

(*a*) Co-operatie om te zorgen dat bezendingen van producten of levende have, uit eenig distrikt te vervoeren, het spoorweg station te gelijker tijd zullen bereiken zoodat zij te zamen truck vrachten zullen uitmaken, en men, dientengevolge, het voordeel van truck vrachtprijzen kan genieten.

(*b*) Co-operatie om te zorgen dat goederen of levende have elders gekocht door de boeren van eenig gegeven district geleverd zullen worden terzelfder tijd en terzelfder plaatse, ook met het doel om truck vrachtprijzen te verzekeren.

(*c*) Co-operatie om gezamenlijk mesten, zaad, of landbouw gereedschap aan te koopen, zoodat men direct met de fabrikanten kan handelen en dus het voordeel van de prijzen voor groote bestellingen kan verkrijgen. (Dit is een vorm van co-operatie die reeds in Natal bestaan heeft.)

(*d*) Co-operatie voor de plaatselijke verzameling en den verkoop van mielies aan het Gouvernement met het oog op Gouvernements kontrakten. (Thans gebeurt het dikwijls dat geen plaatselijke tenders door het Gouvernement ontvangen worden voor de levering van mielies in mielie bebouwde districten, en dat het Gouvernement verplicht is de tender van een tusschen-handelaar op Maritzburg aan te nemen; hetgeen beteekent dat de commissie of profijt van den tusschen-handelaar en de spoorvracht van het district naar Maritzburg en terug naar het district bij de kosten der mielies gevoegd moeten worden. Een combinatie van plaatselijke groeiers kon dus makkelijk tenderen tegen een prijs die voor de leden daarvan beter betalend zou zijn dan die van den tusschenhandelaar ontvangen, en toch tegen een cijfer dat den tusschen handelaar zou uitsluiten.)

(*e*) Co-operatie voor de opberging van mielies in tanken of graanhuizen, om niet gedwongen te worden op een ongunstige markt te verkoopen.

(*f*) Co-operatie, in melk opleverende districten, tot oprichting van zuivel fabrieken, of—waar de onmiddellijke aanleg van zoodanige fabriek haast niet te rechtvaardigen of te gewaagd is—tot het daarstellen van tijdelijke room afscheidende stations, waarvandaan de room alzoo afgescheiden verkocht en gestuurd kan worden aan een van de grootere zuivel fabrieken.

(*g*) Co-operatie, in vruchten groeiende streken, tot verzameling en gelijktijdig wegzending, in gelijke perceelen, van vruchten om de kosten der vracht te verminderen; ook voor de oprichting van fabrieken om vruchten in te leggen en jam te maken.

(*h*) Co-operatie, in pluimveeteelt kringen, voor de verzameling, het sorteeren en het gelijktijdig vervoeren van eiers in een groot rooster in plaats dat elk boer, zooals thans, zijn eigen kleine bezending bezorgt.

(*i*) Co-operatie voor de oprichting van zaken tot bereiding van ham en spek.

Bijzonderheden ten opzichte van eenige dezer voorgestelde vormen van co-operatie zullen, als tevoren gezegd, gereedelijk verschaft worden op aanzoek bij het Departement van Landbouw, Maritzburg.

Experiment Farms.

CEDARA.

To Director Experiment Stations.—

The weather has been exceptionally cold throughout the whole month of June, and the fact of having frost registered on twenty-four different dates also points to the low temperature that has been prevailing. Twelve degrees of frost were registered on several occasions, and the mean for the maximum readings was 66 degrees.

The veld is completely brown and dried off, affording little or no grazing for the working cattle, thus necessitating daily attention to the hand-feeding of them. This is being done by carting mealie stover and grass hay (which has been well sprinkled with diluted treacle), to one of the paddocks, and feeding it from hay-racks that have been recently constructed by the students.

Since the opening of the Farm, which is now close on five years, the working oxen, of which there have been only a limited number, have been kept practically at work daily without a rest. The ordinary routine of field labour has formed only a very fractional part of the work they have done. They have been employed bringing material for the great number of buildings that have been erected, and for transport purposes in connection with other works, particularly the permanent water scheme. It will therefore be readily understood that the oxen are almost worn out, and very difficult to keep in condition in spite of careful feeding.

Ploughing has been continued on cultivated land as well as in the breaking up of veld in one of the paddocks.

Preparatory to having the College grounds laid out as a landscape garden, a portion in front of the building has been broken up. It will thus be benefited by the weathering influences of the winter months, and rendered fit for re-ploughing and cultivation in the early spring.

A gang of convicts is being kept busy digging drains on the vlei. This work is being pushed on with as little delay as possible in order that the ground may be brought into a suitable condition for cultivation early in the spring, having in view your desire to cultivate the vlei land for the coming season's experiments.

The main drains are in the meantime to be open, but lateral drains leading into them will be opened with the mole plough or tiled with pipes, stone, timber, etc., and covered so that there may be no waste of ground and obstruction in cultivation.

The Engineer has been engaged in removing the windmill (that was originally erected for the temporary water supply of the Farm) to the site adjoining the main entrance, where it is erected, to be utilised in pumping water from the spruit to a reservoir which is in course of construction. The work has been so far carried out by students, guided by instructions given in your course of lectures on irrigation and drainage. The vegetable garden will then be conveniently irrigated from the reservoir.

The Carpenter has completed the poultry houses and runs. The next important work awaiting his attention is the removal of the pig sties to a more suitable site, where paddocks of feeding crops are being organised.

The Storekeeper has had an exceptionally busy month in preparing an annual stock return of seeds on hand (this has already been handed to you); further in getting up an exhibit of winter stock feeds, and samples of rations, etc., for the Maritzburg Show, as follows:—Veld hay (baled), millet hay (baled), stover (baled), silage, six different rations for milch cows, thirty varieties of beans, turnips, swedes, carrots, kale, flax, bullrush millet, bullrush millet meal ground in three grades, white soy bean meal ground in three grades, green soy bean meal ground in three grades, mealie meal ground in three grades, mealie pollard, and mealie bran.

From the flock of Persian sheep, two rams and two ewes were exhibited at the Show. A few of the important implements in use on the Farm were also shown, viz., kraal manure distributor, silage cutter and blower, buck-eye seed and manure drill, husker and shredder, and harvester and binder. In order that the husker and shredder could be seen at work to advantage a quantity of mealies (stalks and cob) were provided for the purpose of practically demonstrating the working of the implement. Power was kindly supplied by Messrs. North & Son, who occupied the adjoining site. Judging by the number of spectators who witnessed the operation, it seemingly proved of interest to many farmers, and quite justified the labour of having it shown.

The vegetable garden has been receiving a good share of attention; it is being extended and also receiving deep cultivation. Celery, onions and asparagus have been transplanted from seedlings forced in hot-beds; rhubarb planted and sowings of peas at intervals.

The poultry section is now in full swing, and a further purchase of four Silver Wyandottes has been made. The White Leghorns have commenced laying. An incubator has been secured, and it is intended to be in use early in July.

I have to report generally on the satisfactory progress that is being made by the students, who, as usual, have been employed in their turn at the various branches of work.

Mr. Gessner, who has been transferred from the Winkel Spruit Station, arrived here on the 28th.

I attended the Estcourt Show on the 21st.

ALEXANDER REID,
Farm Manager.

ORCHARDIST, CEDARA.

REPORT FOR HALF-YEAR ENDED JUNE 30TH, 1907.

I have very little of importance to place before you. Few of the trees have reached the bearing stage. A few peaches of Dr. Hogg variety were gathered. Though rather small, they were of good flavour. A few very fine Wickson plums were also gathered. All the trees in the Western Orchard except pears are making satisfactory growth. Some varieties of pears are making little or no growth; they require a more vigorous stock. Trees in the Eastern Orchard are not making quite the same satisfactory growth. They are growing in a more exposed position, with poorer soil; and have been unfortunate enough to get the full force of hailstorms.

The buck have been very troublesome all summer, and if not kept severely in check now they will become a nuisance owing to the amount of cover about.

Practical demonstrations were given to the students during the season. The percentage of "takes" in budding fruit trees will be reported on later.

The heavy thunderstorms did a considerable amount of damage by washing the hillside soil into the vleis. Leguminous crops will be planted this year between the rows of trees to prevent the wash in future. One hailstorm was recorded on the 28th of March, but not nearly as severe as the 1906 storm, although heavy enough to smash all windows on the storm side.

Mr. Taylor, my assistant, was transferred to the Forester on the 25th March at his own request; and Mr. Parsons, from the Hex River Orchard Company, was engaged, and is proving in every way satisfactory. I hope the Department will give him every encouragement to stay in the Service.

Very little planting will be done this year, except to fill in vacancies. The Nursery is well filled with various kinds of young trees, mostly propagated by the students, and will be used in future plantings.

The present stock of animals consists of one mare, two foals, and six oxen. Four more oxen are required to work the place satisfactorily.

About 20 acres of fair mealies were reaped.

STRAWBERRIES.

Strawberries did fairly well, notwithstanding the heavy rainfall. In all 1,100 lbs. were gathered from plots planted at different times and treated with various kinds of manures.

The accompanying table will show results from nine manure plots of 500 square feet each, planted on the 21st November, 1905. The results I consider very satisfactory from the first year's crop, and clearly show the importance of superphosphate over sulphate of ammonia. The plots will be manured on similar lines for two more years, and the results I expect will be more marked in the succeeding years. The difference between Plot 5, yielding the heaviest crop, and Plot 3, with no manure, is 985 lbs. in favour of the manure, or, at the selling price of 6d. per lb., would be £24 12s. 6d., against £1 7s. 6d., the cost of manures.

This year should demonstrate the merits of some 30 varieties in stock. So far President Slachter stands an easy first as an all-round good strawberry, but, strange to say, I have had very poor reports of it from people that were supplied with trial lots. Next on the list come Noble, British Queen, Gunton Park, the Laxton, Laxton's Leader, and Competitor. These have all done well here, but are inclined to be a shade soft for marketing.

Hybridising will be taken in hand next season.

MANURE EXPERIMENTS WITH STRAWBERRIES.

First Year's Results.

Plot.	Kind of Manure.	When Planted.	Rate per Acre.	Cost of Manure.	Gain due to Manure.	Value per Acre at 6d. per lb.
			lbs.	£ s. d.	lbs.	£ s. d.
1	N.	21st Nov., 1905	2,198	1 16 3	412	54 19 0
2	N.P.	,,	2,281	2 15 0	495	57 0 6
3	No Manure	,,	1,786	...	...	44 13 0
4	N K	,,	2,145	2 10 3	359	53 12 6
5	P.K.	,,	2,771	1 12 9	985	69 5 6
6	P 2.	,,	2,711	1 17 6	925	67 15 6
7	N.P.K.	,,	2,570	3 9 0	784	64 5 0
8	P.	,,	2,678	0 18 9	892	66 19 0
9	Bones	,,	2,537	0 16 6	751	63 8 6

Cost of Manures, per Hundred Pounds.

	s. d.	
Sulphate of Ammonia	15 6	per 100 lbs.
Muriate of Potash	14 0	,,
Superphosphate	6 3	,,
Bone Dust	5 6	,,

P. Superphosphate	300	lbs. per acre
K. Muriate of Potash	100	,,
N. Sulphate of Ammonia	300	,,
Bone Dust	300	,,

ROYAL AGRICULTURAL SHOW.

A Fine Exhibit of Tobacco: Shown by Messrs. B. L. and J. Wides, Verulam.

MANURE EXPERIMENTS WITH STRAWBERRIES, PLANTED 21-11-05.

Plot 9, Section 11, E.O.

When Gathered.	N. I.	N.P. II.	No Manure III.	N.K IV.	P.K. V.	P2. VI.	N.P.K. VII.	P. VIII.	B. IX.
	lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.
27th Oct., 1906	0 8	...	0 4	0 4	0 4	0 7	0 7	0 7	0 5
31st ,, ,,	0 9	0 3	0 4	0 4	0 5	0 5	0 4	0 7	0 6
5th Nov., ,,	0 9	0 5	0 3	0 4	0 3	0 3	0 6	0 7	0 6
9th ,, ,,	1 14	1 2	0 10	0 13	0 8	0 4	0 10	0 2	0 12
14th ,, ,,	1 14	1 0	0 12	1 0	1 3	1 14	0 11	1 6	1 6
16th ,, ,,	0 10	0 10	0 7	0 10	0 7	0 5	0 6	0 9	0 10
21st ,, ,,	1 7	1 5	0 12	1 3	1 5	0 14	1 4	0 15	1 7
24th ,, ,,	0 11	1 2	0 15	0 12	1 2	0 15	0 13	0 15	1 1
29th ,, ,,	1 7	3 1	2 2	3 1	3 13	4 1	3 5	3 0	2 12
3rd Dec., ,,	1 3	2 4	1 4	2 4	3 0	2 4	2 9	2 1	2 5
5th ,, ,,	0 2	0 4	0 4	0 8	0 14	0 12	1 0	0 13	0 15
7th ,, ,,	0 2	0 2	0 2	0 2	0 4	0 1	0 4	0 3	0 2
12th ,, ,,	0 14	1 8	1 6	1 4	1 11	1 7	1 13	1 11	1 7
19th ,, ,,	1 3	1 5	1 5	1 13	1 10	1 12	2 0	1 14	1 15
23rd ,, ,,	1 8	1 9	1 3	1 0	1 6	1 8	1 4	1 8	0 9
28th ,, ,,	2 14	1 11	1 7	2 1	2 0	1 14	1 9	2 8	2 8
3rd Jan., 1907	1 5	1 5	1 9	1 11	2 13	2 12	2 6	2 11	2 11
9th ,, ,,	2 0	1 14	1 1	1 8	2 5	2 15	2 9	2 3	2 3
14th ,, ,,	1 1	1 7	0 15	0 14	1 6	1 9	1 6	1 9	1 0
22nd ,, ,,	2 3	2 8	2 1	2 0	3 7	3 2	2 6	3 0	2 14
25th ,, ,,	1 4	1 10	1 10	1 6	1 15	1 14	2 4	2 7	1 8
Totals ...	25 4	26 3	20 8	24 10	31 13	31 2	29 8	30 12	29 2

CAPE GOOSEBERRIES.

Cape gooseberries were a heavy crop, and would pay well if one could depend on markets. The yield per acre was 3,726 lbs. with a dressing of 400 lbs. superphosphate; and the cost to gather is about £1 7s. 6d. per 2,000 lbs.

BRAMBLES.

Brambles will also do well here; 88 lbs. of fruit were gathered from 90 small two-year-old bushes. A few plants of dewberries received from Sir Henry Bale had fruit 1¾ inches long this season. The varieties that have done well are Wilson's Early, Snyder, Childs, Erica, and the Japanese wine berry.

RASPBERRIES.

Raspberries have given no return yet. The only variety that we have in quantity is Golden Queen, and it has turned out a failure here, dying down to the ground each year owing to the canes not being sufficiently ripe before the frost sets in. The same has happened this year. I would suggest giving it a trial for another year, and if it does not give a better account to root them all out. There are in stock small lots of several varieties that are promising better.

SALES.

£28 17s. 11d. worth of fruit was sold during the season, and £8 12s. 9d. worth supplied to the School of Agriculture for making jam.

F. ANDERSON,
Orchardist.

WEENEN.

TO DIRECTOR EXPERIMENT STATIONS.—

During the month attention has been paid to irrigating the various crops, viz., oats, wheat, barley, rye, lucerne, and peas. A fine mulch has been kept on the land through continuous working of the anti-clog weeder and a set of light harrows. The latter operation I consider most essential to the successful growth of the various crops, especially on irrigated land. But when looking around on other lands very little is done in the way of cultivating (except in isolated cases) to conserve the moisture already in the ground, which would minimise the work of irrigating, as an alternative, the land is continually being swamped by the application of water, and all the most valuable elements of the soil suffer in consequence.

The bag of wheat (Standard Fife) which I received from the Central Experiment Farm, Cedara, has been planted, and is making fair growth although sown a month later than the 12 other varieties mentioned in a previous report.

Approximately, two acres of land, which were prepared during the last month, have been sown with six varieties of peas, viz., York Hero, May Flower, King Edward VII., Pride of the Market, Gradus, and Telephone, and valuable comparative data should be secured.

The work of cutting the main drain across the lower end of the Block has been attended to when labour was available. Approximately 100 yards have been excavated, to an average depth of four feet.

As it is your intention that tobacco will be the principal crop grown next summer, I would suggest that some suitable fodder be planted to serve as a windbreak along the boundary fences and various sections. Yuba cane would not only be useful for the above purpose, but would also supply a quantity of succulent fodder for the working cattle throughout the year; if two rows were planted, say, 4 feet apart, one row could be cut for fodder and the other would serve as a windbreak.

The student stationed here left on the 25th June to take his examination papers at the Agricultural College, Cedara, and returned again on the 1st July.

All live stock are healthy.

W. HOSKING,
Curator.

The Orchardist, Weenen, reports as follows for the months of May and June:—During the month of May I had all the beans reaped and thrashed, 13 bags in all, 11 of which, weighing 2,485 lbs., I sent you on the 10th June. I also had the mealies shelled, which gave 6 muids.

The rest of May was taken up in cultivating, etc.

During the month of June Sections 1 and 2 were irrigated, ploughed, and cross-ploughed, and the Citrus Sections also irrigated and ploughed, and part planted with peas. The mealie stalks were all removed from Off-section 4 and the land ploughed. I have marked out all the different sections with jarrah pegs, on which I have stencilled the names of the different varieties for the benefit of visitors. Section 5 (cultivated only enough to keep down weeds) has been hand-hoed. The whole of the orchard has been gone through with the hoes and all weeds removed.

A few very heavy frosts have occurred during the month, which have bitten some of the citrus and guava trees badly. Some varieties of citrus trees, such as the East Indian lime and a few others, have been quite killed, while others have hardly been affected. With the East Indian lime and a few others, the bark has cracked and dried up, leaving the wood exposed. The pear-shaped guava has suffered badly, although the same trees stood all through the winter last year. The Red China has not been so badly affected.

I have had all the raspberries earthed-up and the canes bent over and pinned to the ground. The varieties of strawberries planted 1st May are not doing very well, although frequently watered and cultivated. I think the reason for this is that they were planted a little too late and did not get sufficient root hold before the heavy frosts set in. Some

President Slachter strawberries planted only about a week before the other varieties have done much better under the same conditions. The President Slachter strawberries planted 15th March have done splendidly and are now well established plants. March so far seems about the best month for planting out strawberries.

On an average, five hands were employed during the month.

T. R. M. POLE,
Orchardist.

WINKEL SPRUIT.

To Director Experiment Stations.—

Although the rainfall for the year ending June 30th was a heavy one, we are sadly in need of a downpour at present, as only ·22 inch was registered in June. The veld is beginning to look very dry, but so far none of the crops show any signs of the want of moisture.

The section of new land which was cleared of bush and broken up late last year and planted with maize on January 14th as a manure experiment has been harvested. The yields vary a great deal and show a distinct improvement where chemical manures have been used. Following are the tabulated results:—

Treatment of New Ground.

Rows 5 Feet Apart.

Plots.	Manures, per acre.	Yield in Cobs.	Yield in Grain.	Muids per acre.
		lbs	lbs.	
A	Lime, 2,000 lbs.	213	142	3·181
B	Check Plot—no manure ...	214	143	3·186
C	Kraal manure, 14 tons	204	136	3·146
D	Wood Ash (burned on land), 5 cwt.	396	264	7·52
E	Gypsum, 350 lbs.	388	259	7·24
F	Check Plot—no manure ...	412	275	7·112
G	Concentrated Superphosphate, 80 lbs.	743	495	13 122
H	Basic Slag, 200 lbs. ... ... Nitrate of Soda, 100 lbs. ... Gypsum, 300 lbs.	679	453	12·91

Plot G (where concentrated superphosphate only was used) stood out very conspicuously from the other plots, the plants maintaining from their early stages a dark green healthy appearance. This plot was commented upon by several visitors, including prominent agriculturists.

One row of red Natal beans was planted between each two rows of maize when nearing maturity, and there is every promise of a good yield.

Pig feeding experiments were continued till the 15th of June on the peanuts, and were then removed to sweet potatoes. Following are the results to date:—

PIG FEEDING EXPERIMENTS.

Nos.	Date.	Weight	Date.	Weight	Date.	Weight	Date.	Weight	Date.	Weight	Date.	Weight
	1907	lbs.	1907	lbs.	1907	lbs.	1907	lbs.	1907	lbs	1907	lbs.
1	May 18	52	May 25	59	June 1	64	June 8	68	June 15	74	June 22	86
2	Feed—Peanuts only.	52	Feed—Peanuts only.	59	Feed—Peanuts and 1 lb. mealie meal each.	63	Feed—Peanuts and 1 lb mealie meal each.	68	Feed—Sweet potatoes & 1 lb. mealie meal each.	73	Feed—Sweet potatoes & 1 lb. mealie meal each.	84
3		30		35		40		44		48		61
4		54		62		69		75		79		102
5		41		46		48		51		52		62
6		44		53		59		65		69		83
7		38		43		49		54		62		72
8		46		53		60		66		69		82
9		43		49		55		59		64		75
10		33		37		43		50		54		63
11		36		43		47		53		55		65
12		46		56		64		72		79		92
Totals		515	...	595	...	661	...	724	...	778	...	927

My assistant has been transferred to Cedara, and two students have arrived here from Cedara.

All hands are busy cleaning land and thrashing cane.

W. JOHANSEN,
Manager.

STANGER EXPERIMENT STATION.

SECOND REPORT.

We publish hereunder a report by Colonel Addison, chairman of the committee, on the work of the Agricultural Experiment Station at Stanger. That locality is to be congratulated upon having a resident who so willingly and ungrudgingly gives time and attention to this Experiment Farm. It is understood that he visits it almost daily; and to a busy man like Colonel Addison the supervision he gives to the Farm and to the preparation of the reports must make a considerable encroachment upon his time. Unfortunately, judging from the remarks at the commencement of the report, his enthusiasm is not shared to anything like the same extent by others of the district upon whose interest the Farm has a claim:—

I regret that no report was sent in for the year ending December, 1905. The present report, however, comprises two years' working of the Experimental Farm ending with December, 1906.

I regret that little interest has been taken either by the public, or the Victoria County Association, in this institution, and that I consider the expenditure of public money for the further upkeep of the Farm is hardly warranted.

To be of interest the present report should be studied and compared with the first report, as experiments which had been commenced have in this report been matured. The results will be shown later on. I have selected some of the most interesting and useful experiments for demonstration. These are the results of cane experimnts with fertilizers, experiments in cultivation without fertilizers, experiments with leguminous crops planted as fertilizers, planting at different seasons and months, cane fertilized by one or more applications of manure, planting at intervals and distances, and canes planted from selected sets.

EXPERIMENTS IN DISTANCE PLANTING.

Uba Cane.—Twelve plots planted, rows from 4 feet 6 inches to 8 feet apart, interval between sets 3 feet. The best result in weight of cane was from Plot No. 105: rows 7 feet apart and sets 3 feet apart. Yield from this plot equal to 72,312 lbs. of cane to the acre.

Natal Cane.—Plot 117, rows 7 feet apart, and sets 3 feet apart. Yield equal to 45,575 lbs. to acre. These plots were fertilized with concentrate superphosphate at the rate of 200 lbs. per acre.

Vigour sets or selected plants, 200 lbs. concentrate superphosphate to acre. Uba Cane yield from Plot 121 equal to 66,400 lbs. of cane to acre.

Vigour sets Natal Cane, 200 lbs. concentrate superphosphate to the acre.

Plot 123, yield equal to 30,462 lbs. to acre. It will be seen from these experiments that the distance planting yielded better than the vigour sets. There probably was very little difference in the quality of sets in each case, and the result shows the decided advantage of air and light.

EXPERIMENTS WITH FERTILIZERS.

Canes: Natal, Uba and Lousier.

UBA CANE.

No Manure Plot, yield equal to 68,000 lbs. of cane to acre.

Plot 82, yield equal to 82,662 lbs. to acre. Fertilized with 19 lbs. 4 ozs. sulphate ammonia, 9 lbs. 10 ozs. double superphosphate, 8 lbs. chlor. potash, 90 lbs. lime to the plot (2-25ths of an acre).

Plot 84, yield 80,462 lbs. to acre. Fertilizers: 9 lbs. 10 ozs. double superphosphate, 90 lbs. lime to 2-25ths of acre.

Plot 79, yield 75,775 lbs. to acre. Fertilizer: 24 lbs. bone dust to 2-25ths of acre.

Plot 78, yield 76,562 lbs. to acre. Fertilizer used, 24 lbs. basic slag.

NATAL CANE.

No manure plot, yield 26,687 lbs. to acre.

Plot 87, yield 48,600 lbs. cane to acre. Fertilized by 19 lbs. 4 ozs. sulphate ammonia, 9 lbs. 10 ozs. double superphosphate.

Plot 85, yield 37,800 lbs. cane to acre. Fertilized by 19 lbs. 10 ozs. sulphate ammonia, 9 lbs. 4 ozs. superphosphate, 8 lbs. chlor. potash.

LOUSIER CANE.

No Manure Plot, 22,217 lbs. to acre.

Plot 94, yield 38,860 lbs. to acre. Fertilized by 9 lbs. 10 ozs. double superphosphate.

Plot 96, yield 29,650 lbs. to acre. Fertilized by 24 lbs. basic slag.

All the above plots are 2-25ths of an acre.

It will be seen by these experiments that the application of phosphates has resulted in better yields. Worked out on a money basis, however, the cheaper superphosphate in the shape of bone dust and basic slag would give the larger profit.

EXPERIMENTS WITH BASIC SLAG

Applied at Intervals during Growth of Cane.

Four plots each of Uba and Natal cane planted in plots of 1-20th of an acre each.

UBA CANE.

Plot 31 (No Manure): yield, 4,119 lbs. per plot.

Plot 30: one dressing of 25 lbs. basic slag, two months' planting: yield, 4,175 lbs. of cane.

Plot 29: one dressing at 2 months, one dressing at 6 months—25 lbs. basic slag each dressing: yield, 4,438 lbs.

Plot 28: 25 lbs. at 2 months, 25 lbs. at 8 months, 25 lbs. at 14 months: yield, 4,647 lbs.

NATAL CANE.

Plot 32 (No Manure): 3,632 lbs. per plot.

Plot 33: dressed same as No. 30—yield, 3,739 lbs.

Plot 34: dressed same at 29—yield, 3,939 lbs.

Plot 35: dressed same at 28—yield. 3,830 lbs. This was an outside plot and suffered from pilfering during disturbances.

The conclusion drawn is that it is of advantage to apply frequent dressings, but whether the increased yield would pay for the labour expended is questionable.

DATE OF PLANTING.

A plot has been planted each month, commencing with August and ending with February. These plots will be cut and weighed next October. At present the October planting looks best, followed by November. February's cane looks remarkably well. Four varieties of cane have been planted, Green Natal, Ribbon, Uba, and Lousier.

VARIETIES.

Twenty-five plots of 1-20th of an acre have been planted from various sorts of cane collected from estates and nurseries in the country. These canes have been cut and weighed as under:—

Lousier, 2,726 lbs.; Lousier Sport, 1,345 lbs.; Tamarind, 1,874 lbs.; Gold Dust, 2,305 lbs.; Ribbon, 1,304 lbs.; Bois Rouge, 1,842 lbs.

Eight varieties received from nursery at Zwolle. The numbers of these canes were lost, and I have not been able to get them recognised. The yield from these ranged from 1,411 lbs. to 3,236 lbs. per plot of 1-20th of an acre.

Plot of 15¼ acres, revenue crop; also experiment in cultivation with cow-pea. This land was ploughed in 1904, and planted with catch-crop of cow-pea and mealies; and again ploughed, harrowed, and planted with cane in October, 1905. Will be ready for cutting next October. The results of the mechanical condition of the soil and the advantages of the cow-pea as a fertilizer are very apparent. Results will be published when this plot is reaped.

Plot 1¾ acres cultivation: Florida bean. The land was ploughed. and lay fallow in 1904; ploughed and planted with Florida bean in 1905; and planted with cane in 1906. Looks very promising.

BOONE COUNTY MAIZE.

No Manure Plot, 1-20th acre, yielded 94 lbs. grain.

Plot 26: yield, 125 lbs. grain. Fertilized with 40 lbs. high-grade superphos., 8 lbs. muriate of potash.

Plot 22: yield 100 lbs. Fertilized with 8 lbs. muriate of potash.

MAIZE VARIOUS.

Plot "Yellow Beauty," 1-20th of acre: yield equal to 19¾ muids per acre.

Plot "Hickory King": yield equal to 21·3 muids per acre.

Plot "Ladysmith": yield equal to 25½ muids per acre.

These plots received no manure, but were planted after a crop of potatoes, and only got the residue of potato fertilizer.

COTTON.

DAR-ES-SALAAM SEED.

Six plots 1-20th acre each: yield at the rate of 680 lbs. seed cotton, or 227 lbs. clean cotton, per acre.

SEA ISLAND SEED.

Six plots of 1-40th acre: yield at rate of 913 lbs. seed cotton, or 304 lbs. clean cotton, per acre.

Six plots "Riverside," 1-40th of an acre each: yield equal to 746 lbs. to acre, or clean cotton 248 lbs.

CASTOR OIL PLANT.

Matabeleland seed, 750 square yards: yield 95 lbs. of seed.

Seed from Mr. Wilkinson, 4,810 square yards planted: yield, 1,176 lbs.

Indigenous seed: no yield; eaten by birds.

NITROGEN BACTERIA.

Treated seeds—beans, peas, lucerne, cow-peas, winter tares—were sent from Cedara. A plot was planted with each variety of the treated seed and untreated. The results did not show any difference between the treated seed and untreated.

REVENUE CROPS.

Potatoes.—3½ acres, planted 10th August, 1904, yielded 164 muids potatoes; sold in Durban at £125 11s. 4d.—equal to £35 17s. per acre, and a profit of £25 per acre. Eight acres, planted August and September, 1906, yielded 546 muids; sold in Durban for £173 19s.—equal to £21 14s. per acre, and a profit of £11 per acre.

An orchard has been planted consisting of 50 common orange, 50 Victoria orange, 120 avocadoes, 120 mango, 50 mandarin orange, 50 naartje, 50 peach, 50 papaw, 50 guava, 9 shaddock, 20 grape vines, strawberry, and grenadilla.

One plot of tea planted. Soil seems to be unsuitable; many plants have died.

Pineapples.—The fertilized plots have given good results; some of the pines have weighed 1¾ lbs. Common variety quite free from disease or black spots.

RAMIE.

This has been transplanted to a more suitable spot. A considerable number of slips have been sent to farmers in Zululand.

GENERAL.

A windmill and pump was erected last year for the purpose of irrigating the orchard. I regret to state that this is of very little use, as the supply of water is quite inadequate and not up to expectations.

The supply of labour has been plentiful. The number of natives employed has averaged 10 per diem; rate of pay, 1s. 6d. per diem. Food for natives has been supplied from the Farm.

Mr. Webb has given every satisfaction. He has been careful and methodical in his work and records.

I have endeavoured to make the Farm self-supporting, and have so far succeeded that I have applied for a grant of only £200 for the year terminating June, 1908.

I recommend that a cottage for the Manager be erected on the Farm, and that the sum of £300 be expended on it.

Revenue crops will realise between £300 and £350; those of 1908 about £300. The accounts show a credit balance at the end of 1906 of £144 11s.

The balance of the vote, £201 10s. 3d., together with the proceeds of revenue crops sold last year, will give a considerable balance at the end of the financial year June 30th, 1907.

This balance, with the sale of revenue crop of 1907 and the Government contribution of £200, should leave ample funds for working the Farm for 1907 and building a Manager's cottage.

The present value of all crops on the ground is about £500.

If the revenue crops could be increased to 40 acres of cane each year the Farm would be self-supporting.

I attach a statement showing expenditure and recept from January, 1905, to December, 1906.

FRIEND ADDISON,
Chairman, Experimental Farm, Stanger.

FINANCES.

1st January, 1905, to 30th June, 1906.

	£	s.	d.		£	s.	d.
Balance in hand as per last Report	182	14	7	Manager	238	0	0
Per Government portion 1904-5 Vote	289	18	10	Seeds	40	0	8
Per Government 1905-6 Vote	500	0	0	Manures	96	3	10
Produce sold	196	2	1	Labour and ploughing	392	13	9
				General expenditure (including wind mill)	129	15	4
				Balance	272	1	11
	£1,168	15	6		£1,168	15	6

1st July, 1906, to 30th December, 1906.

	£	s.	d.		£	s.	d.
By balance	272	1	11	Manager	70	0	0
Colonial Government (portion of 1906-07 Vote)	198	9	9	Seeds, etc.	92	14	3
				Manures	19	10	10
				Labour and ploughing	123	19	3
				Sundries	19	15	6
				Balance in hand	144	11	10
	£470	11	8		£470	11	8

Jan. 1, Balance in hand 144 11 10

(Since 1st January the balance of the 1906-7 grant has been received, and also some moneys for crops sold. The estimated credit balance at end of June, 1907, is £300.)

H. C. SMITH,
Hon. Secretary.

Laboratory Notes.

By Alex. Pardy, F.C.S., Analyst.

WATTLE BARK.

Two sample of wattle bark from coast-grown trees were submitted to analysis for the purpose of ascertaining the amounts of tannin they contained at different ages, and also as compared with bark from trees grown inland.

The bark No. 1 was taken from trees 3½ years old, and No. 2 from trees 5 years old. They were shown on examination to contain respectively:—

	No. 1.	No. 2.
Tannins	31·39	33·86
Non-Tannins	10·41	10·67
Soluble Solids	41·80	44·53

A good bark will contain from 35 to 38 per cent. of tannins; a number which have previously been examined have ranged from 28 to 39 per cent., so that, considering the age of these trees, they give promise of a very good return in tannin when a little more matured.

The extract from No. 1 was rather badly coloured and inferior in quality. That from No. 2 was much better in these respects but lacked concentration, a fault which may possibly be remedied by greater age, There appears to be some disposition on the part of buyers to favour bark grown in certain districts or altitudes, and, in view of this fact, the Department have arranged to receive samples from the various wattle-growing districts from time to time in order to ascertain if there is any apparent difference in the product of the various localities, or any peculiarity which may be attributable to the soil or climate. Should any direct evidence be obtained in this direction, it may be possible to indicate to some extent areas which will produce bark of a superior quality, and thus provide against disappointing results which are discovered only after years of waiting.

Gardening Notes for August.

By W. J. Bell, Nurseryman, Florist and Seedsman, Maritzburg.

KITCHEN GARDEN.

Make further sowings of Peas for succession, if required. Full crops may be sown of Asparagus, Cabbage, Carrot, Beet, Globe Artichoke, Lettuce, Radish, Turnip, Leek, Onion, and in the warmer districts where late frosts are not to be feared, Tomato, Marrow, Cucumber, Squash, Capsicum, Melons, and Egg-plant. In the colder districts these should be first raised in tins or boxes by means of a hot bed and frame for planting out the following month.

Transplant Onions from the seed beds sown in the autumn. Plant the sets in drills about 9 or 12 inches apart and about 6 inches apart in the drills. In hard, stiff soils it is a good plan to plant the sets in small ridges, so that when the plants are well established the soil may be drawn away from the bulb, leaving it exposed, with the roots only in the ground. A deep, rich loamy soil is the best for this crop, with the addition of lime or wood ash.

The month of August in the midlands is the best time to sow Rhubarb seed. If sown later the young plants do not get sufficient start before the wet weather sets in and are very liable to damp off. The bed should be well raised and edged with tiles or stones as a protection from flooding rains. Rake the surface fine and level and sow the seed evenly and not too thickly, and cover with a thin layer of fine soil; bat down with the back of the spade, and then cover the bed with litter of some kind, half decayed leaves or straw. This must be left in till the young seedlings show through and then be gradually thinned off as the plants become stronger. Care must be taken not to overwater the bed. These seedlings will produce strong roots for planting out the following spring. The best varieties are Myat's Victoria and Champagne.

Dwarf Beans.—Sowings may be made at regular intervals for succession from August till February.

Plant Jerusalem Artichokes, Asparagus and Rhubarb roots. Rhubarb requires a deep rich soil, well worked and manured well away from overhanging branches of trees. Land sloping towards the south and protected from the north by high ground is the best aspect for this crop.

The planting of deciduous fruit trees should be completed this month if possible, also Grape Vines, Raspberries, Walnuts, Spanish Chestnuts, Filberts, etc.

FLOWER GARDEN.

Hardy Annuals may still be sown from the midlands upwards, such as Pansy, Phlox, Candytuft, Petunia, Mignonette, Coreopsis, Calendula, Larkspur, Gaillardia, Dianthus, Cornflower, etc. Nearer the coast the more tender varieties may be sown, such as Balsam, Nasturtium, Portulaca, Zinnia, Cockscomb, Dahlia, Datura, Amaranthus, etc., including tender climbers, such as *Mina lobata,* Clitoria and Tacsonia; also the various varieties of Ipomea, such as Mexicana and Bona Nox, both having very large pure white flowers, the latter blooming at night; Ipomea Quamoclit or Cypress Vine, small star-shaped flowers in scarlet and white; also the double and single Morning Glories. These beautiful climbing annuals are of a very rapid and luxuriant growth. The flowers will come double, semi-double, and single. The colours vary; there are various shades of blue, white spotted with red, white marbled with purple and lavender, crimson, pure white, etc.

All kinds of perennial border plants should now be planted, such as *Phlox decussata,* Pentstemons, Pinks, Carnations, Cannas, Rudbeckias, Japanese Anemones, Cornflower-Asters, Coreopsis, Gaillardias, Heliotropes, Gladioli, Tube-rose, and the various kinds of Amaryllis and Lily bulbs. In planting Liliums, those having scaly bulbs, the proper depth is of great importance. Many amateurs plant them too shallow. A safe depth is not less than four times the depth of the bulb; should the bulb be two inches high, then the base of the bulb should be eight inches from the surface of the soil.

Some Lilies have only roots at the base of the bulb, others have base roots and stalk roots. The stalk roots are the main support of the plants, so that every encouragement should be given to these; while the roots from the base are working in the interest of the bulb, the stalk roots are working in the interest of the flowers, consequently a top dressing of light rich compost will materially assist this class of bulb.

EDGINGS FOR FLOWER BORDERS.

The Shasta or Ox-eye Daisy and the Pink make the most satisfactory edging for a flower border; both are hardy against heat and cold, retaining their freshness all the year round, and are easily kept within bounds.

Plant out without delay all kinds of deciduous flowering shrubs if not done last month. Both these and evergreen flowering shrubs may be safely planted from tins if the roots are undisturbed.

Correspondence.

LUCERNE CULTIVATION.

To the Editor of the "Agricultural Journal."

Sir,—The short article by Mr. Sawer on the above subject in your last issue is, to say the least, unsatisfactory to me, inasmuch as he does not go far enough, and, in my opinion, the artificial manures chosen were quite the wrong ones for the locality in which these experiments were carried out. What the Weenen man wants to know is: If I have to manure my lucerne, what is the most profitable manure to use and in what quantities? I think nearly everyone knows that the right way to plant lucerne is in drills, and that cultivation is necessary (but not always practised I am afraid), but the right manure I might say no one has yet proved by actual experiment as far as Weenen or similar thorn land is concerned. I am inclined to think that kainit will be the most successful, and certainly nitrate of soda, sulphate of ammonia, and potassium salts should be given a trial; and it is for the purpose of suggesting that these experiments be carried out that I am writing to you. The great thing to discover is the most economical quantity—yet sufficient to get the maximum result with either manure—and when and how to apply it. If; in conjunction with this, the right amount of artificial water (not rain) to be applied can be gauged, an immense boon will be conferred upon all block-holders, who, I feel sure, are at present using a great deal too much water, to the ultimate detriment of their lands.

A description of the grader illustrated would be interesting (it looks home-made), if effective or not, etc., also the price of the rotary Moline mentioned, and the agents.

At the same time, might I refer to Mr. Pardy's article on "Vlei

Soils"? He speaks of ten samples of soil taken from Cedara and six from Weenen, and then gives a tabulated result of seven samples, but gives no clue as to where these samples came from—whether they are Cedara vlei lands or Weenen block soil. In fact, here again I do not think the writer has gone far enough, for I was in hopes we should have had an analysis of each, so as to be able to get a comparison of their agricultural values in an intelligible form, but as the article is now I cannot make head nor tail of it, and I am not ashamed to say so.—Yours, etc.,

G. C. WILLIAMS.

Hillcot.

[It is surely a truism to state that a small contribution to our knowledge of the lucerne crop is less satisfactory than a complete treatise would be. All data, as secured, are immediately placed at the disposal of planters, and it is not thought that any useful purpose would be served by retaining same until an exhaustive trial could be compiled. In support of our argument that the question of cultivation demanded early attention, note may be made of the recent action of the Cradock Agricultural Society, which has offered a prize of £100 for the best lucerne cultivator to be tested under South African working conditions. It has been recognised that in many districts grass and weeds are surely supplanting lucerne, and that their eradication is essential to the very existence of the industry, and further that the conservation of moisture and stirring of the soil will effect a very considerable increase in the crop. The article under discussion, however, represents, to the best of our knowledge, the first definite contribution in South Africa to this subject. Mr. Williams "thinks nearly everyone knows that the right way to plant lucerne is in drills and that cultivation is necessary," but he is asked to state what acreage of drilled and cultivated lucerne could be seen in Weenen prior to the establishment of our experiment plots. Mr. Williams further states that the artificial manures chosen were quite the wrong ones, and suggests Kainit! A reference to the Analyst's report for 1903 shows that the Kainit now sold on the Natal market contains only 12·7 per cent. of potash with a total manurial value of £2 19s. 3d. per ton, for which the price asked is £3. In place of this chloride of potash (muriate) was employed for these experiments, showing 58·58 per cent. potash of a total manurial value of £13 13s. 4d. per ton, for which the price asked is £13 10s. The adoption of Mr. Williams' suggestion would therefore entail the payment on the part of settlers of nearly five times the amount in railway carriage for an equal quantity of available potash. Kainit further contains some 30 per cent. of sodic chloride (common salt), and it has been repeatedly demonstrated that sodium salts are the curse of irrigated lands, examples of which are only too common at Weenen. Kainit is therefore in every respect the least suitable potash fertilizer for irrigated lucerne, being expensive, very heavy, and possibly injurious. Mr. Williams is somewhat difficult to follow when he writes that kainit and potassium salts should be given a trial, for the former is essentially a potash manure, discarded for the reasons given above, and the only profitable alternative, the muriate, has been represented singly and in combination with superphosphate in these experiments. He further suggests that nitrate of soda and sulphate of ammonia be employed, but it is a first principle of agriculture that nitrogenous manures cannot be economically employed with a leguminous crop such as lucerne, which possesses the power of fixing atmospheric nitrogen. Such being the case it is difficult to know what commercial fertilizers could be added to the list already published. Mr. Williams' suggestion *re* quantities of fertilizers and irrigation water have been anticipated and the experiments are already in hand, and it is hoped that results may be published before the end of the coming season.

Agents for the Moline Rotary Cultivator are Messrs. Malcomess and Co., of Durban and East London, from whom a quotation of cost could be secured. A detailed description of the home-made grader, a sketch of which was thought to be self-explanatory, will be published in the ensuing issue of the *Journal*.—E. R. SAWER, Director E.S.]

BURLINGTON HYBRID MEALIES.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—I have just threshed and sacked the returns from an experimental patch of Burlington Hybrid mealies, and the result is so very satisfactory that I feel constrained to ask you to publish it as, if this mealie will grow in other parts of the Colony as well as it has done with me, then its cultivation should be encouraged as much as possible.

My seed plot was a measured 8¼ acres; but, as a few yards on river side got washed out in our January flood, I only estimate upon a full 8 acres. From this piece of ground I have just power-threshed and sacked up *one hundred and forty muids seven pounds net.*

I planted 15 lbs. seed to the acre, in rows 34 inches apart, using 400 lbs. of Thomas' phosphates (last year this piece of land carried potatoes, and for that crop had a dressing of 6 cwt. Fison's complete potato fertilizer). Land was prepared by disc-ploughing twice; then the rows were opened and the manure applied along the rows. Then a light subsoiler was run down each row, and the seed planted behind it, and finally the land was tooth-harrowed. Crop cultivation consisted of: anti-clog weeder twice; scuffled three times; hand-hoed twice. Planted on November 15th and 16th, they were ready to reap early in March, although, owing to the rush of other work, I let them stand very much longer, and on this account no doubt the weight was reduced somewhat.

This mealie belongs to the sweet corn family, and that justifies closer planting than can be practised with our other varieties. I secured my seed from Messrs. F. Kirchhoff & Co., of Johannesburg; and, judging from a letter received from them, my case does not appear to be an isolated one. I trust other growers of this variety will also publish their returns.

I may state that the land these were grown on is a deep light red, slightly sandy; and this is the fourth crop it has carried.

I may mention that my neighbour, Mr. Mortimer, of "Wykom," and others have more than once examined these mealies at different stages of growth, and Mr. Mortimer has seen the reaped crop.—Yours, etc.,

F. W. K. PANZERA.

Ekutokozeni, Ingogo.

FRUIT CULTURE.

MRS. H. E. KIRBY, Highlands, writes requesting information on the following points:—

1. What is the difference between "self-sterile" and "self-fertile" as applied to pear treas? She presumes the difference is ascertainable from the blooms. Are the bearing and non-bearing flowers in the pear as distinct as they in the cucumber? She frequently inoculates the latter, especially if bees are not plentiful.

2. In grafting pears on to quince stocks, must the stocks be of the bearing kind?

3. Where are Marianna plum roots to be had; and what is the origin of the Marianna plum?

4. What will the result be if she takes manure from the cattle kraal, pigsty, and fowl roost, and ashes, all mixed up, and apply to the orchard?

5. In budding on the old peach stocks, is it absolutely necessary that the stocks should be transplanted?

6. Some of her 5-year-old apple trees are showing blight (Aphis) badly. She has been advised not to prune them, as last year she painted every cut with castor oil, and this season the Aphis (in some cases) is in possession of the trees.

To this the Conservator of Forests replies as follows:—

1. Self-sterile pear trees are those in which the flowers of one tree do not fertilize themselves, and pollen from another tree is necessary to effect fertilization. On self-fertile pear trees the flowers fertilize themselves. The flowers are usually so nearly perfect that no difference in appearance is to be noticed, but if a self-sterile kind is grown at a long distance from any other pear trees it is not likely ever to bear a crop. If grown along with others it will only crop if the pollen of some other kind is available at the same time as the pistils are in condition to receive it. Planting different kinds mixed usually effects fertiliza-

tion, and I have never known artificial fertilization to be resorted to in the case of pears grown in the open air.

2. Any quince stock may be used for grafting pears on, but the results will depend very much on the nature and moistness of the soil. All quinces bear if properly treated, but the quince is often not the best stock for the pear.

3. Marianna plum is seldom grown for its fruit, but rather as a stock for other kinds. It is not in use in this way in this country, but is often so used in America.

4. Satisfactory.

5. No, it is not advisable.

6. The apple trees should be pruned if they require it, quite irrespective of the blight.

Animal Diseases in June.

THE POSITION OF EAST COAST FEVER.

THE Principal Veterinary Surgeon (Mr. S. B. Woollatt) reports that the following outbreaks of East Coast Fever occurred during the month of June:—Sunday's River 1, Vryheid and Ngotshe 7, Durban County 1, Dundee and Umsinga 5, Paulpietersburg 2 (on already infected farms). The following deaths from the disease were reported during the month: —Lower Tugela and Mapumulo 159, Ladysmith 34, Vryheid and Ngotshe 750, Durban County 146, Umvoti County 4, Muden 40, Dundee, Umsinga and Nqutu 467, Paulpietersburg 184. No record is being kept of deaths taking place in Zululand. Exclusive of those that took place in Zululand, there were therefore 1,784 deaths recorded during June.

With reference to the outbreaks in the Ladysmith district, Mr. Woollatt states that all the cattle within the infected area were branded, and a zone free of cattle formed around them. The branding of cattle within that portion of the Ladysmith district on the east of the main line is also being proceeded with, but the brand used here will be different from that used within the actually infected area. Another outbreak occurred in the Ladysmith district towards the junction of the Tugela and Sunday's Rivers. Only one native kraal is affected on the Ladysmith side, the remainder of the outbreak being on the Umsinga side of the river. This outbreak was not known by the Veterinary Department to exist until the end of May, and there appears to be no doubt, Mr.

Woollatt remarks, from the number of skins found at the scene of the outbreak that some 70 head of cattle had died previous to the information being received by the Department, notwithstanding the fact that, when East Coast Fever first appeared in the Dundee and Umsinga districts, the natives were warned by the Magistrates to report any deaths which might occur amongst their stock. This outbreak has occurred in a very rough and inaccessible part of the country, where a number of cattle might die without being detected if the owners did not report the fact, even if the Department had a number of officers inspecting the district. It must be conceivable, Mr. Woollatt thinks, to anyone who has a knowledge of this district, that a Stock Inspector having under his supervision the whole of the Klip River district or the whole of the Umsinga district cannot know of all deaths which are taking place in remote corners of such districts. It has been said, since this outbreak has been detected, that cattle had been known to have died there for some time. If an individual was in possession of such information, Mr. Woollatt adds, it is to be regretted that he did not realise that it was his duty to make a report to the Department. All the cattle concerned in this outbreak have been removed from the infected and veld adjacent to infected veld through temperature camps.

In the Muden area on the Weenen side the disease has made considerable progress; and it is on this account that arrangements have been hastened for the taking over of these cattle and disposing of them for slaughter. Since the granting of free railage ceased there has been a falling-off in the number of cattle trucked in the several infected districts.

In Durban County there was one fresh outbreak of East Coast Fever. Though within the actually infected area, it is on the side of this area towards Umkomaas. It is hoped to be able to satisfactorily deal with the cattle in this area and thus remove the great danger that is being incurred at present through animals being removed across the Umlazi Location.

The fresh outbreaks reported in the Dundee Division are in the vicinity of the farm "Hazeldean." In this vicinity, along the Buffalo Flats, there are no fences, and the disease, D.V.S. Bruce states in his report to the P.V. Surgeon, will continue to spread here, as may well be expected, at a considerable rate. Overlapping in grazing is the cause of this, as most of the owners have shown no anxiety regarding the East Coast Fever until the disease has actually appeared amongst their own stock. Temperature camps have not been adopted here, but all infected and in-contact herds have been branded with the infected area brand.

Dundee is the chief district concerned with regard to the question of the adoption of a stamping-out policy. The number of cattle it is considered necessary to remove if such a policy were adopted is seen from a statement in D.V.S. Bruce's report that, in the Dundee-Umsinga area, taking a 3-mile radius around all infected areas, the number of cattle is 7,547. These, Mr. Bruce adds, may be considered as infected and in-contact cattle, and are being branded accordingly.

To date, no East Coast Fever is known to exist north of the Glencoe-Vryheid railway. South of this railway many of the owners have disposed of their cattle for slaughter purposes.

In the Mahlabatini and Nongoma districts of Zululand, as in the Vryheid district, the disease, Mr. Woollatt states, is making considerable and certain progress.

OTHER DISEASES.

Lungsickness.—There have been no further outbreaks of this disease, and it is hoped that the infection amongst the troops under license has died out.

Sheep Scab.—During the month there were 40 fresh outbreaks, and six licenses were raised.

Glanders.—In the Newcastle district two animals were destroyed during the month, reacting to the Mallein test. One death took place in the Dundee district.

Biliary Fever.—One death occurred from this disease.

Anthrax.—One death was reported.

Quarter-evil.—Two deaths took place from this disease.

Poverty.—In the Verulam district deaths from poverty were of frequent occurrence during the month, necessitating constant supervision on the part of the District Veterinary Surgeon and the Stock Inspector. Wherever possible a *post-mortem* examination is being made.

Importation of Stock by Sea.—D.V.S. Amos reports that 201 horses, 185 mules, 186 donkeys, 1 bull, 294 sheep, and 17 dogs were imported into Natal by sea during June. Of the horses, 193 came from the Argentine Republic and the remainder from England. The mules and donkeys came from Argentina. All the sheep came from Australia, and were breeding stock proceeding to the Transvaal and Orange River Colony. The bull and the dogs came from England.

For a combination of early laying with table propensities the recently resuscitated Sussex fowl occupies an exceptional position, and we are glad, says the *Agricultural Gazette* (London), that it is receiving so marked a degree of favour, though there are dangers even in that at the present time, owing to an undue attention to merely external characters. It is, however, a breed well worth the attention of practical poultry keepers.

South African Markets.

THE prices for live stock, and animal and vegetable produce, realised on the Maritzburg, Durban, Johannesburg, and other South African markets during the month of June-July, have averaged as follows:—

NATAL.

PIETERMARITZBURG.—The Market Master has furnished the following prices realised on the Maritzburg market during the month:—

Live Stock.—Fowls, 2s; ducks (Muscovy), 1s 9d; (English), 2s 3d; turkeys (cocks), 10s; (hens), 5s; rabbits, 1s 6d.

Animal Produce.—Eggs, 1s 4d per doz; butter, 1s 6d per ℔; cheese, 8d per ℔; bacon, 7d per ℔; ham, 9d per ℔; pork, 5d per ℔; lard, 8d per ℔; honey, 6d per ℔; hides, 7d per ℔.

Vegetable Produce.—Buckwheat, 12s 9d per muid; earth nuts, 10s per muid; barley, £2 10s per ton; oats, £2 per ton; hay, 30s per ton; kafir corn, 8s per muid; mealies, 7s per muid; potatoes, 9s per muid; sweet potatoes, 3s per muid; peas, 18s per muid; onions, 10s 6d per muid; beans, 15s per muid; pumpkins, 30s per ton; bananas, 1s 6d per hundred; oranges, 2s per hundred; naartjes, 2s per hundred; lemons, 6d per hundred.

DURBAN.—The Market Master reports the following average prices realised on the Durban market during the month ended 15th July:—

Live Stock.—Sucking pigs, 4s; fowls, 2s 1d; ducks, 2s 6d; turkeys, 8s; guinea-fowls, 3s 6d; rabbits, 9d.

Animal Produce.—Eggs, 1s 6d per doz; butter, 1s 6d per ℔; bacon, 7d per ℔; pork, 3½d per ℔; honey, 6d per ℔.

Vegetable Produce.—Kafir corn, 9s per muid; mealies, 7s 6d per muid; potatoes, 10s 6d per muid; sweet potatoes, 3s per muid; turnips, £2 15s per ton; pumpkins, 5s per ton; oranges, 9d per hundred; naartjes, 1s per hundred; avocado pears, 2s per doz.

TRANSVAAL.

JOHANNESBURG.—Writing under date July 15th, Mr. Alfred Webb, produce agent, P.O. Box 2342, Johannesburg, representing the Farmers' Co-operative Associations of the Cape Colony, reports the following average prices realised on the Johannesburg market during the preceding week:—

Live Stock.—Cows (milk), £18 to £35; oxen (slaughter), £8 10s to £11 10s; oxen (dressed), £1 12s 6d to £1 15s per 100 ℔s; sheep (slaughter hamels), 20s to 25s; sheep (dressed), 5½d to 5¾d per ℔; donkeys, £6 to

£9; mules, £15 to £20; fowls, 1s 6d to 3s; geese, 5s; turkeys (cocks), 7s to 13s; (hens), 3s 6d to 7s; ducks, 2s 3d to 3s 6d.

Animal Produce.—Eggs (new laid), 2s to 2s 6d per doz; (fresh), 1s 9d to 2s per doz; butter, 1s to 1s 3d per ℔.

Vegetable Produce.—Bran, 7s 6d to 8s 9d per bag of 100 ℔s net; barley (grain), 10s 9d per bag of 160 ℔s net; beans (dry), 9s to £2 3s per bag of 200 ℔s net; chaff, 3s 9d to 4s 6d per 100 ℔s; forage, 6s 6d to 7s 6d per 100 ℔s; kafir corn, 12s 3d to 12s 9d per bag of 200 ℔s net; lucerne (dry), 5s 6d to 6s 6d per 100 ℔s; earth nuts, 15s to 18s per 100 ℔s; manna, 2s 3d to 3s 9d per 100 ℔s; mealies: white 8s 9d to 9s, yellow 9s 3d to 9s 9d, mixed 8s 6d to 9s per bag of 200 ℔s net; onions, 9s 6d to 12s per muid; oats (seed), 10s 6d to 11s per bag of 130 ℔s net; peas (dry), 15s 6d to 18s 6d per bag of 200 ℔s net; potatoes, 13s 6d to 16s, medium 9s to 13s 3d per bag of 160 ℔s net; sweet potatoes, 4s to 8s per bag of 120 ℔s. net; wheat, 18s to 20s 6d per bag of 200 ℔s net; fruit: avocado pears, 3s per doz; bananas, 2s to 3s 6d per 100; lemons, 2s to 4s per 100; naartjes, 1s 6d to 4s per 100; oranges, 2s to 4s per 100; pineapples, 2s 6d to 3s 6d per doz.

NOTES.

Mr. Webb also furnishes the following notes upon the conditions prevailing in the Johannesburg market:—

Live Stock.—Prices for the month ending 15th inst. are generally better than those shown in my last report. An occasional shortage in supplies caused prime beef to realise as high as 40s per 100 ℔s during the month, but the majority of sales have averaged out at from 32s 6d to 35s, with plenty of stock coming forward. The tendency of the slaughter market is to harden as the winter goes on, and advanced prices are anticipated next month. At the time of writing only best-conditioned animals command active business at top prices. A good enquiry exists for fat slaughter hamels and lambs, as also for pigs dressing from 80 to 100 ℔s. As previously predicted, values for all classes of poultry have increased appreciably, and a big business can be done in this section.

Animal Produce.—Eggs and butter are placed at current quotations, with a constant demand from the market for best quality. Monthly contracts can be placed for guaranteed goods.

Vegetable Produce.—Prices for most grain foods have eased off automatically with over-supply, and as consignments show no signs of diminishing there is little animation in the market unless an exceptionally fine parcel comes under the hammer. Mealies, barley, beans, peas, oats and bran are all lower, and only first quality is in demand. A fair enquiry continues for best varieties of kafir corn; and good dry yellow onions are firm at current quotations. Forage is easier, due primarily to over-speculation in outside dealings; whilst potatoes of best quality are enquired for at firmer rates. Large consignments of pressed lucerne are under offer from the Cape at higher values than this market can give. Big business in this article can be done on the basis of 6s per 100 lbs delivered, provided the hay is of first quality and green-coloured.

Fruit.—In this section large transactions have taken place in citrus varieties, and better all-round prices would have been recorded if growers had taken more trouble to make themselves acquainted with the requirements of this market. I shall be very pleased to answer all enquiries in regard to grading, packing, etc. Fruit-growers in Natal are cautioned that all fruit forwarded to Johannesburg infected with scale is fumigated at a cost of 4d to 8d per case, according to size of package, and that any naartjes found infected with codlin moth are immediately destroyed.

PRETORIA.—Messrs. M. Guinsberg & Co., produce and commission merchants, report the following average prices realised on the Pretoria market during the week ended July 19th:—

Live Stock and Animal Produce.—Pigs, £1 18s to £2 11s; fowls, 1s 6d to 3s 4d; eggs: local 2s to 2s 4d, Colonial 1s 5d to 1s 8d per doz; butter, 1s 6d per lb.

Vegetable Produce.—Mealies: yellow 8s 6d to 9s, white 8s 3d to 9s 6d per 203 lbs; bran, 9s 6d to 10s 6d per 100 lbs; forage, 20s to 23s 6d per 100 bundles; forage, inferior, 16s to 19s; hay, pressed, 6d to 1s 4d per bale; potatoes: local 14s to 16s, medium 10s to 13s 6d per bag; tobacco, 4½d to 6d per roll; lucerne, green, 1s to 1s 9d per doz bundles.

CAPE COLONY.

The following information has been compiled from the latest available report of the Cape Superintendent of Agricultural Co-operation (for the week ended 13th July), appearing in the *Cape Times*:—

Grain, Cereals, etc.—During the week under review the demand for wheat was exceedingly strong, which was anticipated to continue until a fall took place in the Australian market. There were large supplies of the Caledon oat on the market, for which buyers were not immediately forthcoming. A demand cannot be recorded for rye or barley, mealies replacing the latter article. Compressed chaff was steady and sales had been effected. Kafir corn was slightly easier. Lucerne and oathay remained very firm. Mealies were plentiful in the O.R.C., Natal, and Eastern Province varieties. Prices were easier, although advices stated that the Bloemfontein market was slightly firmer.

The following prices are recorded in respect of the week under review:—

Colonial wheat, per 200 lb.—Caledon, 1st, 16s 9d to 17s; Malmesbury, 17s 9d to 18s; Moorreesburg, 17s 6d to 17s 9d; Porterville-road, 18s to 18s 6d.

Colonial oats, per 150 lbs.—Caledon, 1st, 8s 6d to 8s 9d; 2nd, 8s to

8s 3d; Moorreesburg, 10s to 10s 1½d; Malmesbury, 10s 2d to 10s 3d; Main Line, 10s 7d to 10s 9d.

Colonial barley, per 150 lbs.—Moorreesburg, 9s 9d to 10s; Main Line Stations, 10s to 10s 6d.

Colonial rye, per 200 lbs.—Country stations, 16s 9d to 17s.

Kafir corn, per 200 lbs.—Red, 12s 9d to 13s; white, 12s 6d to 12s 9d, ex stores, Capetown.

Bran, per 100 lbs.—6s to 6s 3d, stores, Capetown.

Mealies, per 200 lbs.—Natal yellows, 12s 3d to 12s 6d; O.R.C. small yellows, 14s to 14s 6d; Natal white coast, 10s 6d to 11s; Eastern Province Germans, 13s to 13s 6d; Eastern Province mixed, 12s 9d to 13s.

Forage, per 100 lbs.—Colonial lucerne hay, 5s 6d to 5s 9d, ex stores, Capetown; Colonial oathay, 4s 8d to 4s 9d, Main Line stations; Moorreesburg, 4s 4d; Malmesbury, 4s 5d to 4s 6d; Colonial fodder, 5s 6d to 5s 9d, ex stores, Capetown; Colonial compressed chaff, 1s 11d to 2s, Main Line stations; Moorreesburg and Malmesbury, 1s 9d to 1s 10d.

Live Stock.—The demand for live stock remains firm. The average prices realised during the week under review were:—Prime slaughter oxen, 37s 6d to 38s 9d per 100 lbs dressed weight; slaughter sheep, 48 to 50 lbs dressed weight, 22s 6d to 24s 6d.

Animal Produce.—Butter (Colonial): best 1s 3½d wholesale, 1s 3d in bulk, retail 1s 6d per lb; cheese: good Colonial Cheddar 10¼d per lb wholesale, Colonial Camembert 10s per doz; Colonial National Cream 4s 6d per doz; eggs, 10s 6d to 13s 6d.

Morning Market.—Cape lemons, 10d to 1s; limes, 2s 6d to 3s; bananas, 20s to 22s; oranges, 1s 1d to 4s 1d; naartjes, 7d to 6s 9d; potatoes, 12s to 14s; sweet potatoes, 6s to 7s; onions, 7s; beans, 24s; Natal beans, 40s to 42s.

PORT ELIZABETH.

Market poorly supplied. All classes of grain excepting mealies. Prices little changed. Potatoes: Market slumped. Overstocked in onions. Rush bedding is required. Strong inquiries for Early Rose seed potato. Seed oats: no immediate hopes of early improvement.

The following average prices were realised during the week ended 6th July:—Mealies, 6s to 6s 3d per 100 lbs; kafir corn, 6s 6d to 7s per 100 lbs; potatoes, 4s to 7s 6d per 100 lbs; sweet potatoes, 2s to 2s 6d per 100 lbs; barley, 4s 3d to 4s 6d per 100 lbs.

KIMBERLEY.

Messrs. Jas. Lawrence & Co., Ltd., reporting for the week ended 13th July to the Bloemfontein *Post*, state, with reference to the Kimberley market:—

Mealies, white and yellow, are coming in very freely for the past week, and prices have receded. Kafir corn is still rather scarce, though we expect fair quantity during next week. Forage and oats are slightly easier. Small demand for good sample lucerne. There is still a good supply of Colonial meals in the market. Good demand for sound dry onions. Potatoes are still very plentiful and prices low. Fair demand for fresh butter and guaranteed fresh eggs. Poultry plentiful; cabbages have advanced; cauliflowers slightly firmer. Oranges and naartjes very low in price. Game in demand. Very little doing in live stock; no demand for pigs.

Live Stock.—Oxen (good) prime, 600 lbs upwards, £9 to £13; cows (good), 450 lbs upwards, £5 10s to £8; calves, 5½d per lb, dead weight; pigs, 100 lbs (clean), 3d per lb, live weight; lambs, 30 lbs, 12s 6d to 14s; hamels, 40 lbs to 45 lbs, 15s to 20s; oxen (trek), £7 to £8; draught horses, £10 to £25; mares, £10 to £25; ducks, 2s 6d to 3s; fowls, 1s 6d to 2s 3d; turkeys, 4s to 10s; hares, 1s to 2s 6d; guinea-fowls, 2s to 4s.

Animal Produce.—Butter: fresh 1s to 1s 4d, second quality 9d to 11d per lb; eggs, 1s 3d to 1s 5d per doz.

Vegetable Produce.—Bran, 7s 3d to 8s per 100 lbs; barley, 7s 6d to 12s 6d per 163 lbs; forage: good 6s to 6s 6d, inferior 3s 6d to 4s 6d per 100 lbs; kafir corn, S.A., 8s 6d to 11s; mealies: yellow Colonial 8s 6d to 10s, white Colonial (hard) 9s 6d to 11s 6d, mixed 7s 6d to 9s 6d per 203 lbs; mealie meal: O.R.C., 10s 6d to 11s, white 10s 6d to 11s 9d per 183 lbs; Cape oats, 11s 6d to 12s 9d per bag of 150 lbs; lucerne hay, 4s 6d to 5s per 100 lbs; onions, 7s to 11s per bag of 120 lbs; potatoes, 4s to 10s per bag of 120 lbs; wheat, 17s to 20s per bag of 203 lbs; naartjes, 1s to 2s 6d per 100; oranges, 2s to 4s 6d per 100; pineapples, 1s 6d to 2s 6d per doz.

The Oversea Maize Market.

THE following information regarding the oversea maize market has been compiled from *Beerbohm's Evening Corn Trade List*:—

During the week ended 7th June, the continued liberal shipments from Roumania and Russia quite counterbalanced the deficit in the Argentina exports, which latter, moreover, are now increasing. The demand fell off during the week and the prices obtainable for cargoes were 3d. to 6d. lower on the week, 23s. 6d. being the best bid for La Platas for June-July shipment, whilst at the corresponding date last year 20s. 3d. was the price. Danubian-Bulgarian, June-July, would also have come at 23s. 6d., but buyers held aloof, partly because of the improvement in the new crop prospects, owing to the beneficial rains in Roumania. America was offering but little maize and exporting only moderate quantities; and it is stated that the export movement during the remainder of this year is not likely to increase, except at high prices. Last year's exports from June 1st to December 31st were only 30 million bushels, against 53 million bushels in the previous year, and 35 million bushels in 1904. The future course of maize prices has, no doubt, the *Corn Trade List* continues, to be connected to some extent with that of wheat, seeing that other feeding-stuffs remain very dear, and under these circumstances one can hardly foresee low prices for maize, especially as the main depressing element, viz., an almost unlimited supply of La Plata corn such as has existed for the past few years, will be absent this year.

During the week ended 14th June, there was a very poor demand for maize, and prices gave way rather decidedly. Shipments continued quite liberal, especially for the U.K., thanks to a large output from Roumania and Russia. Argentina also was beginning to ship more freely, though the total since May 1st was still very small compared with previous years, viz., 612,000 qrs., against 2,075,000 qrs. last year. According to recent mail advices, there was still much difficulty in arriving at any definite conclusion with regard to the probable surplus this year, the estimates still ranging from 2½ to 5 million quarters, as compared with 12 million quarters last season. The present visible supply in Argentina is about 275,000 quarters, against about 600,000 quarters last year, and 900,000 quarters in 1905. Very few cargoes changed hands during the week under review; 23s. 3d. was accepted for 2,700 tons La Plata, lately sailed, whilst July-August shipments would come at 22s. 9d., thus showing 9d. to 1s. decline on the week; for Danube-Bulgarian, June shipment, 22s. 4½d. is refused. Parcels for London fluctuated considerably, and were decidedly easier compared with the preceding week; 23s. was paid for Gal-Fox, June-July shipment, on 7th June; on 12th as low as 22s was accepted, but on the following day up to 22s. 7½d. was paid. Odessa afloat sold at 22s. 9d. c.i.f., whilst spot parcels ex-ship were offered on the 12th at 22s. 1½d.

There was a decided improvement in the market during the week ended 21st June, in spite of very large Roumanian shipments. The U.K. demand was not, perhaps, very active, but for the Continent there was quite a good enquiry, and 6d. to 1s. advance on cargoes was easy to obtain; 23s. 6d. to 23s. 7½d. was bid for La Plata steamers afloat, whilst for shipment 23s. 4½d. to 23s. 6d. was paid; Bessarabian, June O/S shipment, made 24s. 6d., Foxanian afloat 24s., and Danubian shipping 23s. 3d. Parcels for London were quite active during the week. The recent wet weather in Roumania has been extremely beneficial for the growing maize crop, the area sown being also believed to be much larger than last year, much land usually devoted to barley and oats being sown with maize, because it was too late to sow barley or oats. The Hungarian area under maize is also reported to be 500,000 acres greater than last year and to be promising well. In Mark Lane, during the week in question, up to 24s. ex-ship was paid for picked samples of kiln-dried American, whilst Odessa ex-ship was worth 23s. 6d. to 23s. 9d., or 1s. 6d. above the price accepted ten days previously.

There was not much activity in the maize market during the week ended 28th June, but the good Continental demand served to maintain prices, in spite of very large shipments. The American shipments this season have been, remarks the *Corn Trade List*, very disappointing in quantity, in view of the record crop supposed to have been harvested last year. During the week 23s. 4½d. was accepted for La Plata cargoes afloat, a price which would buy other cargoes loading or for shipment; 23s. was taken for a steamer of Danubian Gal-Fox afloat for U.K., whilst the Continent paid 23s. per 480 lbs. for a handy cargo loading, and 23s. 9d. to 23s. 10½d. for cargoes of Novorossisk for shipment. According to latest cabled advices, the American crop was not in a very favourable condition, either in Kansas or the North-West, owing to the cold weather. With regard to the probable future of maize, it is not easy, remarks the *Corn Trade List*, to foresee any important changes; there is evident abundance in Roumania and Russia, and evident relative scarcity in Argentina, thus reversing last year's conditions. It may be argued that abundance in South-Eastern Europe is not so depressing a factor as similar conditions in Argentina might be; but, perhaps, the strongest feature in favour of maize prices being maintained for some time at a fairly high level is its relative cheapness compared with other feeding stuffs, and compared also with wheat.

The general statistical position of maize carried up to date (June 28th) was as follows:—

	1907—qrs.	1906—qrs.	1905—qrs.
On passage to U.K.	910,000	985,000	800,000
,, ,, Cont.	1,290,000	1,100,000	805,000
Imports into U.K. for the 25 weeks ending June 22	5,334,900	5,247,900	5,168,850
Visible supply in U.S. *(Bradstreet's)* ...	1,863,200	1,287,800	871,300
	1906-7	1905-6	1904-5
American crop	340,000,000	316,000,000	285,000,000
	1907.	1906.	1905
New York, Spot	63c	59½c	62¼c
Mark Lane, Mxd. Am. ex-ship ...	23/9	22/6	23/9

SHIPMENTS OF MAIZE TO EUROPE FROM JAN. 1 TO DATE.

	1907. U.K.*	1907. Cont.	1906. U.K.*	1906. Cont.	1905. U.K.*	1905. Cont.
	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.
America	2,588,000	2,810,000	3,108,000	4,857,000	3,139,000	4,297,000
Argentine	944,000	638,000	2,022,000	1,545,000	1,864,000	1,136,000
Russia	849,000	1,135,000	99,000	129,000	149,000	319,000
Danube, etc. ...	1,064,000	1,662,000	121,000	644,000	118,000	133,000
Total ...	5,445,000	6,245,000	5,350,000	7,175,000	5,270,000	5,885,000

* Includes shipments for orders.

Meteorological Returns.

Meteorological Observations taken at Government Stations for Month of June, 1907.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.).				RAINFALL (IN INCHES).					
	Means for Month.		Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heav'st rainfall in 1 day.		Total for Year from July 1st, 1906.	Total for same per'd from July 1st, 1905.
	Maximum	Minimum					Fall.	Day.		
Observatory ..	74·4	52·4	83·5	46·3	·34	6	.27	18th	41·37	37·35
Stanger ..	75·3	52·9	88	47	1·11	7	·53	1st	39·86	36·64
Verulam ..	75·6	50·1	85	45	·15	2	·10	17th	42·24	28·90
Greytown ..	70·2	33·2	2	30	·02	1	·02	18th	37·29	25·02
Newcastle .	70·2	34·6	77	27	Nil	—	—	—	55·60	30·27
Estcourt ..	70·3	32·3	78	25	Nil	—	—	—	30·66	24·82
Ndwedwe ..	64·3	53·0	73	47	·14	2	·07	18th	40·78	37·26
Mid-Illovo ..	70·5	48·0	83	40	·14	3	·12	18th	44·42	29·55
Camperdown ..	7[illegible]·2	43·0	88	38	Nil	—	—	—	39·84	—
Port Shepstone ..	74·8	50·9	87	46	·98	2	·90	18th	—	—
Umzinto ..	72·1	47·9	76	43	·37	2	·22	17th	47·45	36·18
Richmond ..	70·9	39·7	82	33	Nil	—	—	—	51·88	34·64
Maritzburg ..	72·9	36·7	82	30	Nil	—	—	—	53·05	26·01
Howick ..	68·5	32·7	80	25	Nil	—	—	—	43·83	24·32
Dundee ..	64·0	40·8	72	20	Nil	—	—	—	37·61	28·14
Weenen Gaol ..	74·7	30·6	84	24	Nil	—	—	—	30·85	22·45
Impendhle ..	62·8	34·1	68	25	·01	2	·01	15th	46·72	—
New Hanover ..	70·7	35·4	82	28	Nil	—	—	—	55·80	27·36
Nqutu ..	66·2	42·6	74	36	Nil	—	—	—	—	20·47
Nongoma ..	71·3	43·0	79	37	·25	1	·25	20th	48·32	21·97
N'Kandhla ..	65·5	35·8	72	29	·25	2	·23	18th	34·90	25·01
Mtunzini ..	70·5	38·0	78	32	·67	3	·37	17th	—	—
Hlabisa ..	75·0	54·3	84	50	Nil	—	—	—	44·93	27·20
Melmoth ..	69·7	47·7	79	40	·12	1	·12	19th	38·81	23·21
Ubombo ..	77·4	52·8	85	4[illegible]	·10	2	·07	14th	49·51	—
Point ..	—	—	—	—	·85	4	·47	18th	43·22	42·23
Bulwer ..	—	—	—	—	·00	1	·00	1st	—	—
Charlestown ..	62·1	29·5	67	20	Nil	—	—	—	53·46	—
Vryheid ..	69·3	38·5	78	31	Nil	—	—	—	36·85	—
Mahlabatini ..	75·6	45·1	86	40	·03	1	·03	18th	38·93	23·[illegible]8
Amatikulu ..	75·8	47·5	84	42	·47	5	·32	17th	28·13	—

Meteorological Observations taken at Private Stations for Month of June, 1907.

STATIONS.	TEMPERATURE (in Fahr. Degrees)		RAINFALL (in inches).					
	Maximum for Month.	Minimum for Month.	Total for Month.	No. of days.	Heaviest Rainfall in one day.		Total for Year from July 1st, 1906.	Total for same period from July, 1905.
					Fall.	Day.		
Giant's Castle	64·1	35·9	Nil	—	—	—	49·58	28·76
Adamshurst (Wm. Adams)	86	36	—	—	—	—	—	—
Ottawa (G. Wilkinson)	—	—	0·20	1	0·20	19th	43·56	—
Mount Edgecombe (Natal Estates) ..	90	47	0·29	3	0·17	19th	49·16	34·12
Cornubia ,, ..	—	—	0·35	—	—	—	51·13	30·69
Milkwood Kraal ,, ..	—	—	0·12	—	—	—	37·88	22·68
Blackburn ,, ..	—	—	0·32	—	—	—	42·54	27·[illegible]6
Saccharine ,, ..	—	—	0·16	—	—	—	43·55	28·44
Equeefa (W. Hawksworth)	86	49	0·43	3	0·26	18th	50·57	34·76
Umzinto, Beneva	—	—	0·34	3	0·21	17th	48·91	33·87
Winkel Spruit	83	46	0·22	3	0·14	17th	45·11	39·17

Coal and Labour Return.

Return of Coal raised and Labour employed at the Natal Collieries for the month of June, 1907 :—

Name of Colliery.	Average Labour Employed.									Output.	
	Above Ground.			Below Ground.			Unproductive Work.*				
	E.	N.	I.	E.	N.	I.	E.	N.	I.	Tons.	Cwt
Natal Navigation ..	29	65	233	18	242	140	—	—	—	18,907	14
Elandslaagte	14	20	270	17	185	417	4	8	7	14,688	15
Dundee Coal Co. ..	15	13	182	8	26	312	1	—	22	11,112	6
Glencoe, Natal ..	13	106	82	11	494	14	—	—	—	10,106	14
St. George's	16	120	118	11	188	103	—	8	—	9,854	—
South African	10	11	89	11	220	45	5	28	46	9,343	10
Natal Cambrian ..	10	34	136	10	258	68	2	2	—	9,004	1
Durban Navigation ..	29	115	44	11	238	43	1	4	—	8,977	—
Newcastle	8	42	21	6	250	2	1	2	—	6,240	7
Natal Steam Coal Co. ..	1	41	3	2	149	2	1	2	2	2,745	2
Ramsay	2	12	35	5	130	100	3	6	11	2,646	7
West Lennoxton ..	5	1	62	2	27	95	—	—	—	2,541	—
Central	3	51	10	5	97	8	—	2	—	2,521	10
Talana (Natal) ..	2	10	14	2	27	32	1	3	3	865	16
Zululand	3	40	—	1	55	—	4	10	—	504	10
Woodlands	2	5	4	1	8	4	—	—	—	219	—
Vryheid†	3	7	—	3	9	—	—	—	—	40	—
Signal Hill ..	—	—	—	—	—	—	1	1	—	10	—
Dumbi Mountain‡ ..	1	2	—	—	—	—	—	—	—	8	—
Nooitgedacht	—	2	—	1	2	—	—	—	—	4	—
Totals	166	697	1,303	125	2,705	1,415	24	76	91	110,339	12
Corresponding month, '06	139	619	1,168	127	2,270	1,465	54	241	264	95,133	19

* Cost charged to Capital Account. † March, April and May Returns. ‡ May Return.

Maritzburg,
6th July, 1907.

CHAS. J. GRAY,
Commissioner of Mines.

Return of Coal bunkered and exported from the Port of Durban for the month of June, 1907 :—

	Tons.	Cwt.
Bunker Coal*	44,102	19
Exported to :—		
Algoa Bay	6 973	7
Cape Town	12,166	0
United Kingdom	2	0
Mauritius	2,149	15
Total	65,349	1

* Including Foreign Warships.

(Signed) GEO. MAYSTON,
Collector of Customs.

Custom House, Port Natal,
1st July, 1907.

Return of Farms at Present under Licence for Lungsickness and Scab.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
A. P. Craw	Ladysmith	Scab	Mzlambi	Rossboom
		,,	J. N. De Waal	Blauw Bank
		,,	Vellum	,,
		,,	Mholosi	,,
		,,	Ingenga	Roodepoort
		,,	P. Nicholson	Nicholson's Nek
		,,	H. Bowes	Zaarfontein
		,,	Mabela	Roodepoort
		,,	J. Pepworth	Eenvogel Vlei
		,,	D. Sparks	Berg View
		,,	W. Wright	Maggiesdale
		,,	G. J. McDouling	Waterford
		,,	W. Anderson	Netherby
		,,	Jimze	Rossboom
		,,	Kantool Zuma	,,
		,,	E. Moreland	Reimt Kuil
		,,	Mapelwana	Roodepoort
J. R. Cooper	Nkandhla & Nqutu	,,	M. Butelezi	Jojosini
		,,	Amangayehlezyo	Mangene
		,,	Halangana	Nqutu
		,,	L. Nene	,,
		,,	L. Rheuga	Dalala
		,,	T. Nxumalo	Macebo
		,,	Mkungeni	Jojoseni
		,,	A. Mbala	Blood River
S. A. Brown	Underberg	,,	J. A. Stone	
		,,	T. de C. Arbuckle	Kerridge
		,,	B. Phipson	Strathcampbell
		,,	M. Fraser	Winterhoek
		,,	R. C. Gold	Woodend
		,,	J. R Royston	Greenend
		,,	J. van Whye	Silburn
		,,	F. A. Hathorn	Sauguana
		,,	T. Palframan	Slogoma
A. B. Koe	Portion of Estcourt	,,	H. J. Hatting	Servitude
		,,	J. J. B. Cooke	Estcourt
		,,	Sclander Bros.	Kelvia
		,,	Mnali	Labuschagne's Kraal
		,,	H. L. Frances	Rietfontein
		,,	Bacon & Kelly	Winterton
		,,	F. R. Moor	Greystones
A. J. Marshall	Dundee	,,	R. J. du Bois	Giba
		,,	J. W. de Bruyn	Rooifontein
		,,	C. M. Vermaak	Paddock
		,,	L. W. Meyer	Langverwacht
		,,	A. L. Jansen	Strathearn
		,,	J. O. Nel	Earnscliffe
		,,	A. C. Vermaak	Sigtuna
		,,	T. C. Vermaak	Harriotdale
		,,	H. Vermaak	Paddock
		,,	J. Dyson	The Chase
		,,	P.J. & H.J. Jordaan	Prestweek
		,,	P. Mshabi	West Port
		,,	Gaga and others	Carolina
		,,	Wade Bros.	Stanton
E. Varty	Western Umvoti	,,	W. J. Slatter	Holm Lacy
J. J. Hodson	Ptn of Lion's River	,,	W. A. Dales	Gowrie
		,,	N. McKellar	Glenafton
		,,	R. Spiers	Moyeni
R. Mayne	Krantzkop	Lungsickness	P. R. Nel	Broeder's Hoek
		,,	Maqamganse	Loots Hoek
		,,	Uqupu	Myoniezwe's Locat'n
		,,	Ndabane	,,
		,,	S. Johnson & Co.	Inadie Store
		,,	Ndabane	Myoniezwe's Locat'n
		,,	Natives	Spitzkop
		,,	,,	Myoniezwe's Locat'n
		Scab	H. L. van Rooyen	Krantzkop

RETURN OF FARMS AT PRESENT UNDER LICENCE FOR LUNGSICKNESS AND SCAB—*continued.*

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
A. H. Ball	Weenen	Scab	G. J. van der Westhuiyzen	Winterhoek
		,,	C. H. Rottcher ..	Golden Valley
		,,	J. P. Lotter ..	Bergvlei
		,,	C. F. Lotter ..	Blinkwater
		,,	E. E. Robinson ..	Mona
		,,	L. C. Kinsman ..	Mount Moriah
		,,	Deya ..	Lilyfontein
		,,	Vunyo and others ..	Elena Berg
G. Daniell ..	Vryheid ..	,,	D. Coetzee ..	Schaapkopje
		,,	R. L. Davies ..	Kambuldraai
		,,	Nkanyeze	Mooiplaats
		,,	Mhomon	Aanhouvin
		,,	Hlabalan	Nootgedacht
		,,	J. C Emmett ..	Goudhoek
		,,	P. H. Tredoux ..	Bellvue
		,,	Myamana ..	Weltevrede
		,,	D. Coetzee ..	Doornhoek
		,,	Mabekashen ..	Nooitverwacht
R. Mayne ..	Eastern Umvoti ..	Lungsickness	C. van Rooyen ..	Boschtontein
		,,	Nkabi and others	Loots Hoek
		Scab	P. R. Botha ..	Olivefontein
		,,	Nkomo	Thorn View
		,,	Mtshugongubu ..	Olivefontein
		,,	J. Oliver	Greytown Town Lds.
		,,	G. J. Maritz ..	Fair View
J. Button	Portion of Estcourt	Lungsickness	J. Bird	Mooi River T'n Lds.
		Scab	W. Smith ..	Riverside
		,,	C. L. Jonnson ..	Darlington
		,,	Jim	Rensburg Spruit
E. Parkinson ..	New Hanover ..	,,	Ndabeni and Jim ..	Location
A. Hair	City and Umgeni ..	,,	Umbabana ..	Zwaartkop Location
		,,	Ungola	Edendale
		,,	Unsizwa	Zwaartkop Location
		,,	Umveli	,,
D. M. Pfaff ..	Utrecht	,,	Voorman ..	Koppie Allen
		,,	Hermanus ..	Vecht Kop
		,,	Thomas	Groot Vlei
		,,	Vauns and Lamoen	,,
		,,	P. O. Pretorius ..	Geluk
J. Stewart ..	Bergville ..	,,	Puzi	Klein Waterfall
		,,	Menu	,,
		,,	Mseli	,,
		,,	P. H. van der Reit	The Lake
		,,	A. Wright ..	Rhenosterfontein
		,,	C. Halforty ..	The Falls
R. Wingfield Stratford	Newcastle ..	,,	M. Radford ..	De Wet Stroom
A. Brown ..	Polela	,,	W. Wilkinson ..	Long Elmsell

MANGE IN HORSES EXISTS AS UNDER.

Name.	District.	Name.	District.
W. E. Oates	Bergville	Nseleni	Underberg.
Mboyea	Bergville.		

Pound Notices.

NOTIFICATION is contained in the *Government Gazette* of the sale, unless previously released, of the undermentioned stock on the dates specified:—

On the 7th August:—

Boston.—Black ox, no marks or brands, about 3 years old; running on the farm "Crowle," Deepdale, and reported by Mr. D. F. Smith as too wild to be driven to the Pound.

Charlestown.—Black mare, aged, height about 14·1, branded M on right rump.

Finchley (Ixopo Division).—Light bay gelding, blaze, hog mane and tail, large lump on near side under saddle, mangy.

Good Hope (Klip River Division).—Ewe lamb, impounded by Natal Police, branded *M* on right side, half moon and slit in right ear, about eight months old.

Howick.—(1) Bay pony mare, long mane and switch tail, back points, no brands. (2) Two-year-old heifer, black, with white flank, branded N.2, off-side ear stumped, and near-side ear one notch and bit out of top (running on the farm "Outhorne," and previously reported by Mr. T. W. Woodhouse, but cannot be sent to Howick Pound on account of East Coast Fever restrictions).

Solferino (Gourton).—(1) Little white boar pig. (2) Little white sow pig.

Utrecht.—Black yearling ox, branded A.N. left hip. Probable value about £1. Running on the farm "Nooiensboom," Utrecht District, belonging to Mr. J. du Plessis, and reported by I. du Plessis on the 14th June as unable to be driven to the Pound on account of being blind.

On the 21st August:—

Finchley (Ixopo Division).—(1) Black sow pig. (2) Black sow pig, four white feet, white on belly. (3) Small black-and-white sow pig. (4) Black-and-white hog pig.

Hope Farm (Newcastle Division)—Black she-goat, right ear slit, with bluish kid, about six months, no ear-marks.

Loteni.—Bay filly, about three years old, no marks or brands visible (reported on the 17th June as too wild to be driven to the Pound, and running on the farm "Ripon," Underberg Division, occupied by Mr. T. Barnett.

Melmoth.—Ten donkeys (five mares and five foals), light grey colour, no brands or marks.

Mooi River.—Black cow, aged, white belly, small horns lying forward, branded on near rump, looks like 21 or ZI, very poor.

Nqutu.—Four Kafir goats, mixed colours, one with V cut out off side ear, others with no particular marks.

Umsinga.—(1) Three head Kafir goats, two black and one brown, no brands or marks. Probable value, £1. (2) Two head Kafir sheep, black, no brands or marks. Probable value, 15s.

It is notified that the Pound established at Jackal Spruit, Klip River Division, has been abolished, Mr. F. Brandon having resigned his appointment as Keeper thereof.

Brands Allotted to Infected Magisterial Divisions.

The following is a list of the brands which have been allotted to the several infected Magisterial Divisions:—Durban County, D. 2; Alexandra County, A. 2; Lower Tugela, T. 2; Mapumulo. S. 2; Inanda, B. 2; Umsinga, U. 2; Dundee, X. 2; Vryheid, V. 2; Ngotshe, H. 2; Paulpietersburg, P. 2; Nongoma, G. 2; Mahlabatini, L. 2; Ndwedwe, N. 2; Weenen County, W. 2; Umvoti, F. 2; Hlabisa, K. 2; Eshowe, E. 2; Ladysmith R. 2; Babanango, O. 2.

East Coast Fever.

SLAUGHTER CATTLE.

The Department of Agriculture has erected abattoirs adjoining the Government Cold Stores, Maritzburg, where people will be able to forward cattle from clean and infected areas for slaughter. Killing, chilling, and freezing can be undertaken by the Department if desired, and arrangements can also be made for the forwarding by rail of meat intended for sale in markets outside Maritzburg. This will enable farmers, who wish to dispose of their stock for slaughter and find a difficulty in so doing, to have their animals killed in Maritzburg and the meat forwarded to Durban or any other market. The abattoirs will be under the personal supervision of Mr. A. R. Burford, the Manager of the Government Cold Stores, who is thoroughly experienced in this particular class of work.

The provisional abattoir charges are :—

Cattle per head ...		... 1s., with a minimum of £3 per killing space per month.
Sheep		... 1½d. each.
Pigs...		... 3d. ,,
Chilling and Freezing Beef,	1st week ...	... 1s. 3d. per qr.
,, ,,	2nd ,, ...	... 1s. ,,
,, ,,	Remaining weeks ...	9d. ,,
Sheep	... per week ...	... 3d.
Pigs	,, ..	... 6d.

Charges for killing and handling Cattle and placing same in Cold Storage, if required, or meat to be taken away by customer from hanging-room :—

Cattle, per head ...	... 4s. each (including abattoir fee).
Sheep	... 6d. ,,
Pigs	... 1s. ,, up to 200 lbs.
,, ...	... 1s. 6d. each, over 200 lbs. & up to 300 lbs.
,, ...	... 2s. ,, over 300 lbs.

W. A. DEANE,
Minister of Agriculture.

Department of Agriculture, Maritzburg,
9th April 1907.

Central Experiment Farm, Cedara.

In order to minimise interference with the general course of work on the Central Experiment Farm, Cedara, it has been found necessary to set apart one day of the week, namely, Friday, as a visitors' day.

Arrangements will accordingly be made on that day for receiving visitors and showing them round the Farm. A trap will be at Cedara Station to meet the up 9.50 a.m. train ; and if intending visitors from up-country will give notice to the guard at Howick Station, on their way down, a trap will be sent to meet the train which passes through Cedara at 11.2 a.m. Visitors travelling by other trains will also be met if they will previously make arrangements by writing.

On other than the visitors' day, visitors may be received by appointment, but special attention cannot be guaranteed in regard to their being shown round.

With reference to the visits of Agricultural Associations, in view of the fact that the cost of railway tickets is in future to be borne by the Department of Agriculture, and that the catering involves such a strain upon the resources of the School of Agriculture, it has been decided to limit the number of delegates from any one Association to 25 per cent. of its membership. At least 14 days' clear notice must be given by Associations, so that there may be time to make all necessary arrangements.

All communications in connection with proposed visits to the Experiment Farm should be addressed to the Director of Experiment Stations, Cedara.

W. A. DEANE,
Minister of Agriculture

27th April, 1907.

Executives of Farmers' Associations.

ALFRED COUNTY FARMERS' ASSOCIATION.—President: A. G. Prentice, J.P. Vice-Presidents: C. Knox, J.P., L. T. Trenor. Committee: C. M. Etheridge, E. J. Gray, W. B. Rethman, H. W. F. Rethman, C. A. Howell, R. E. H. Fann, J.P., W. T. J. Gold, Dr. Case, Revd. S. Aitchison. Hon. Treasurer: H. C. Hitchins. Secretary: T. Tribe.

BOSTON FARMERS' ASSOCIATION.—President: Thomas Fleming. Vice-President: J. Geldert. Hon. Secretary and Treasurer, W. J. Fly.

CAMPERDOWN AGRICULTURAL SOCIETY.—President: John Moon, C.O.; Vice-Presidents: A. N. Kirkman, J.P., and G. Swales; Hon. Secretary: — Wilson.

CAMPERDOWN AND DISTRICT FARMERS' ASSOCIATION.—President: John Moon. Vice-President: F. N. Meyer. Hon. Sec.: L. Baker.

DUNDEE AGRICULTURAL SOCIETY.—President: F. Turton, Esq., J.P. Vice-Presidents: The Minister of Agriculture, the Mayor of Dundee, Messrs. A. L. Jansen, H. Ryley, and W. Craighead Smith, J.P. Hon. Secretary and Treasurer: J. McKenzie. Committee: D. C. Pieters, D. Macphail, W. H. Tatham, H. Baasch, M. Taylor, J. A. Landman, N. F. Hesom, A. W. Smallie, C. W. Whysall, W. Craig, C. G. Willson, T. P. Smith, J. Campbell, J. B. Duboisee, W. R. Quested, A. Grice, D. Meumann, W. J. H. Muller, J. E. Caldwell, E. C. Saville, C. M. Meyer, A. J. Oldacre.

DURBAN COUNTY FARMERS' ASSOCIATION.—Patron: J. H. Colenbrander. President: J. McIntosh. Vice-Presidents: H. Westermeyer, R. R. McDonald. Committee: F. R. W. Bœhmer, G. Compton, H. Freese, W. Freese, W. Gillitt, H. W. Kœnigkræmer, H. W. Nichols, F. Schæfermann. Hon. Sec. and Treasurer: Frank J. Volek.

ESHOWE DISTRICT FARMERS' ASSOCIATION.—President: J. R. Pennefather. Vice-President: C. F. Adams. Secretary: T. Parkins. Treasurer: W. T. Brockwell.

GOURTON FARMERS' ASSOCIATION.—President: W. C. Stockil, Esq., J.P. Vice-President: M. Sandison, Esq. Hon. Secretary and Treasurer: Frederick B. Burnard, Esq.

HATTING SPRUIT FARMERS' ASSOCIATION.—President: Wm. Craig. Vice-President, J. Campbell; Committee: J. J. S. Maritz, G. De Waal, H. J. Hearn, Thos. Brookes, N. Glutz, H. Glutz, W. A. Quested, J. A. Brookes, W. J. Hislop, Thos. Dewar, J. Humphries, W. H. Tatham, A. E. Norman, D. W. H. Tandy; Hon. Secretary and Treasurer: R. J. Hearn.

HIMEVILLE AGRICULTURAL SOCIETY.—President: Henry C. Gold, Dartford, Polela. Vice-Presidents: W. Little, R. Justice, G. Malcolm. Executive Committee: G. Malcolm, W. S. Johnston, P. McKenzie, W. Little, G. Royston. Hon. Secretary and Treasurer: Thos. E. Marriott, Brookdale, Polela. Assistant Secretary: F. W. Fell, Ericksburg, Polela.

HOWICK FARMERS' ASSOCIATION.—Chairman, Thos. Morton; Vice-Chairman, M. A. Sutton; Hon. Secretary and Treasurer, A Clark.

INGOGO FARMERS ASSOCIATION.—President: Angus Wood, J.P. Vice-Presidents: G. A. Fimstone and J. Browning. Hon. Secretary and Treasurer: C. Watt.

IXOPO AGRICULTURAL SOCIETY. — President: W. Arnott. Vice-Presidents: F. L. Thring, J.P., John Anderson, C. E. Hancock, J.P. Committee: W. K. Anderson, J.P., Thos Allen, J. C. Auld, H. D. Archibald, F. S. Beningfield, S. Boyd, F. E. Foxon, R.M., Wm. Foster, Jas. T. Foster, Geo. E. Francis, L. Gray, A. M. Greer, J.P., J. R. Greer, Wm. Gold, Jno. Gold, H. A. Hill, C. F. Harriss, A. E. Keith, R. Kennedy, Geo. Martin, W. Oakes, L. J. Phipps, T. F. Remfry, J. W. Robinson, Jas. Schofield, M.L.A., A. Stone, W. R. Way, G. C. Way, A. H. Walker, M.L.A, J. L. Webb (F.R.C.V.S.). Hon. Sec: R. Vause. Hon. Ass. Sec.: C. K. D. Beales. Hon. Treasurer: T. Arnott.

IXOPO FARMERS' ASSOCIATION.—President: A. E. L. Keith, Ixopo. Vice-Presidents: Geo. Martin, Claybrooke, Ixopo; A. Kirkman, Lufafa, Ixopo. Hon. Secretary and Treasurer: Geo. E. Francis, Morningview. Ixopo. Delegates to Farmers' Union: President and James Foster. Committee: F. Remfry, R. Vause,

C. E. Hancock, John Anderson, R. Greer, W. Oakes, D. Campbell, G. C. Way, James Foster.

KLIP RIVER AGRICULTURAL SOCIETY.—President: Herman Illing; Vice-Presidents: J. T. Francis, J. G. Bester, W. Pepworth. Auditor: J. T. Francis. Esq. Secretary: E. Scott, F.I.A. (Lond.). Executive Committee: A. Brink, D. Bester. J. Farquhar, C.M.G., W. C. Hattingh, J. G. Hyde, Trev. Hyde, A. L. Horsley, W. Freer, L. A. Leonard, H. Nicholson, J. H. Newton, J. T. Sandalls, W. H. Roberts, H. C. Thornhill.

LION'S RIVER DIVISION AGRICULTURAL SOCIETY.—President: Graham Hutchinson; Vice-President: H. Nisbet; Executive Committee: H. Nisbet, M. A. Sutton, A. J. Holmes, J. Humphries, Jno. Pole, and W. A. Lawton; Auditor: W. J. R. Harvard; Hon. Sec. and Treasurer: Arthur F. Dicks, P.O. Box 1, Howick.

LOWER TUGELA DIVISION ASSOCIATION.—President: T. G. Colnebrander. Vice-President: Lieut.-Col. F. Addison. Hon. Secretary and Treasurer: H. Curtis Smith. Committee: A. S. L. Hulett, A. E. Foss, G. Stewart, J. B. Hulett.

LOWER UMZIMKULU AGRICULTURAL ASSOCIATION.—President: D. C. Aiken, J.P. Vice-Presidents: H. Albers and C. H. Mitchell, J.P. Hon. Secretary and Treasurer: W. J. Plows. Committee: C. Manning, J. W. Aiken, W. G. Camp, T. F. Godwin, J. Hutton, H. Norden and A. Borchard. Hon. Secretary, Show Committee: J. W. Aiken. Show Committee: A. E. Collison, A. Borchard, F. Knoop, A. Ringo, H. F. Voigts, J. Hutton, C. Manning, A. J. Lugg and H. Albers. Hon. Auditor: J. W. Aiken.

MID-ILLOVO FARMERS' CLUB.—Chairman: L. G. Wingfield-Stratford, J.P. Vice-Chairman: B. B. Evans. Hon. Secretary: J. W. V. Montgomery. Assistant Hon. Secretary: S. C. Phipson. Hon. Treasurer: Jos. McCullough.

MOOI RIVER FARMERS' ASSOCIATION.—President: C. B. Lloyd; Vice-President:—R. Garland; Hon. Treasurer: H. A. Rohde; Collector: Capt. W. H. Stevenson; Auditor: Claude Scott; Hon. Secretary: E. Cautherley.

MUDEN AGRICULTURAL ASSOCIATION.—President: Thos. Thresh. Vice-Presidents: Wm. Lilje, E. A. Grantham. Secretary and Treasurer, C. A. Selling. Committee: Otto Rottcher, Karl Lilje, Karl Rotter, Herman Schafer, Fritz Torlage, T. Braithwaite, Ernest Rottcher, C. H. Tilbrook, Rev. H. Rottcher (Hon. Life Member).

NEWCASTLE.—President: F. A. R. Johnstone, J.P. Vice-President: C. Earl, J.P., Mayor of Newcastle; Angus Wood, J.P., Ingogo; O. Schwikkard, C.M.G., Newcastle. Secretary: Wm. Beardall. Treasurer: Ed. Nicols. Executive Committee: L. H. S. Jones, E. Phillips, H. C. Caldecott, C. Watson, G. Langley, W. A. Lang, W. J. P. Adendorff, J. E. de Wet, O. Davis, S. W. Reynolds, B. Pettigrew, G. W. Thomas, G. H. Bishop, H. R. Muir, M. C. Adendorff, W. Napier, P. Van Breda, Chriss Botha, G. Templer.

NEW HANOVER AGRICULTURAL ASSOCIATION.—President: R. H. Oellermann. Vice-Presidents: J. C. Watt, J.P., and J. A. Westbrook. Life Member: C. A. S. Yonge, M.L.A. Secretary and Treasurer: W. D. Stewart, New Hanover. Auditor: J. H. F. Hohls. Committee: W. N. Angus, E. Bentley, W. W. Bentley, Edward Boast, H. W. Boast, E. E. Comins, G. R. Comins, C. Crookes, jun., G. Demont, H. Dinklemann, J. Duval, W. Fortmann, Dr. C. H. Herbert, J. Hillermann J. H. F. Hohls, H. Jacobson, H. A. Light, G. C. Mackenzie, A. F. Mackenzie, T. M. Mackenzie, J. Muirhead, J.P., G. Moe, J. Moe, O. Moe, C. Oellermann, F. Oellermann, R. H. Oellermann, J. C. Otto, H. Oellermann, E. Peckham, J.P., J. A. Potterill, S. Peckham, C M. Scott, Rev. J. Scott, Wm. Schroder, J.P., Owen Solomon, J. H. Smith, Riby Smith, H. Thöle, F. Thöle, H. Vorwerk, H. F. Westbrook, W. H. Westbrook, C. Westbrook, T. Wolhuter.

NOODSBERG ROAD AGRICULTURAL ASSOCIATION. — President: Fritz Reiche, J.P.; Vice-Presidents: H. Mummbrauer, P. Rodehorst, W. Dralle, W. Wortmann; Committee: W. Bartels, F. Bosse, H. Brammer, A. J. Bruyns, H. Bruyns, Carl Dralle, H. Gebers, W. Gevers, J. H. Holley, jr., W. C. Holley, C. Hillermann, L. Koch, H. Köhler, F. E. Kuhn, M. Maister, H. Mereis, A. Meyer, H. Meyer-Estorf, H. W. Meyer, K. A. Meyer, H. Misselhorn, W. Misselhorn, K. Peters, I. Pfotenhauer, G. Rabe, G. Reiche, Joh. Reiche, W. Rencken, H. Rosenbrock, H. Schmidt, K. Schmidt, Rev. Jas. Scott, K. Seele, F. J. Smith, J. Thies, W. Witthöft, P. Worthmann, A. Wortmann, F. Wortmann, H. Wortmann; Secretary: Paul Vietzen, P.O., Singletree; Hon. Treasurer: E. Beurlen.

NOTTINGHAM ROAD FARMERS' ASSOCIATION.—President: W. Henwood, J.P., Vice-President: B. Greene; Auditor: A. Mengens; Secretary and Treasurer; C. J. King, Nottingham Road.

PIETERMARITZBURGSCHE BOEREN VEREENIGING. — President: D. P. Boshoff; Secretary: E. G. Jansen, 313, Loop Street, Maritzburg.

RICHMOND AGRICULTURAL SOCIETY — President: John Marwick. Vice-Presidents: W. P. Payn, A. W. Cooper, J. W. McKenzie and Chas. Nicholson. Honorary Treasurer: R. Nicholson. Hon. Secretary: Tom M'Crystal. Committee: J. W. T. Marwick, Evan Harries, R. A. McKenzie, F. O. Howes, H. M. Moyes, W. Comrie, Thos. Marwick, J. C. Nicholson, J. W. Flett and E. J. B. Hosking.

ROYAL AGRICULTURAL SOCIETY OF NATAL.—President: Sir G. M. Sutton, K.C.M.G. Vice-Presidents: His Worship the Mayor, Messrs. Jas. King, O. Hosking, D. C. Dick, Col. E. M. Greene and P. D. Simmons. Executive: Sir G. M. Sutton, President; Messrs. Jas. King, O. Hosking, D. C. Dick, Col. E. M. Greene and P. D. Simmons, Vice-Presidents; Committee: G. J. Macfarlane, W. S. Craft, W. H. Cobley, H. J. Stirton, W. J. O'Brien, L. Line and Sir T. K. Murray. Yard Superintendent: H. J. Stirton. Secretaries, Treasurers and Collectors: Duff, Eadie & Co., 12, Timber Street, Pietermaritzburg. Auditor: G. V. Lambert.

SLANG RIVER (UTRECHT) FARMERS' ASSOCIATION.—Chairman: P. J. Kemp; Executive Committee: J. J. Uys, J. Z. Moolman, T. J. Botha, P. J. Viljoen, P. J. Kemp; Hon. Sec. and Treasurer, Thys Uys, Utrecht P.O.

UMVOTI AGRICULTURAL SOCIETY.—President: Major T. Menne. Vice-Presidents: Theunis J. Nel, M.L.A., W. J. Slatter, W. L'Estrange. Executive Committee: Tol Nel, A. Newmarch, W. Lilje, O. Rottcher, S. C. Van Rooyen, W. Newmarch, E. J. Van Rooyen, O. Norton, I. M. Nel, J. Browning. Managers of Show Yard: J. M. Handley and N. Hunter. Hon. Auditor: W. K. Ente. Secretary and Treasurer: W. H. Gibbs.

UPPER BIGGARSBERG FARMERS' ASSOCIATION.—President: George Langley; Vice-President: W. L. Oldacre; Secretary: J. H. Murray.

UTRECHT AGRICULTURAL SOCIETY.—Chairman: L. Viljoen; Vice-Chairman: B. H. Breytenbach; Members: I. Bierman, M. M. Knight, J. H. Klopper, B. C. Hattingh, T. Botha, M. Gregory, P. L. Uys, H. P. Breytenbach; Secretary: G. J. Shawe.

UTRECHT BOEREN VEREENIGING.—President: D. J. A. van der Spuy; Secretary: G. J. Shawe, Utrecht.

VICTORIA COUNTY AGRICULTURAL SOCIETY.—President: Lieut.-Colonel F. Addison; Vice-Presidents: Sir Liege Hulett, Kt., M.L.A., W. J. Thompson, Esq., J.P., J. Polkinghorne, Esq., M.L.A.; Committee: Messrs. W. H. B. Addison, G. S. Armstrong, M.L.A., C. Bishop, J.P., D. Brown, sen., J.P., W. Campbell, T. G. Colenbrander, A. E. Foss, J.P., A. S. L. Hulett, J.P., J. B. Hulett, C. Jackson, G. Nicholson, J.P., T. Polkinghorne, J. W. Perkins, J.P., E. Saunders, J.P., G. Stewart, and J. H. Stansell; Hon. Secretary and Treasurer: H. Curtis Smith (Stanger)

WEENEN AGRICULTURAL SOCIETY.—President: A. F. Henderson, Esq., C.M.G.; Vice-Presidents: J. Button, J.P., Jas. Ralfe, J.P., H. Blaker, J.P., E. B. Griffin, J.P.; Hon. Treasurer: F. C. Schiever; Auditor: S. Wolff; Executive, Hon. H. D. Winter, R. H. Ralfe, J. W. Moor, D. W. Mackay and Allan Stuart; Manager of Show Yard: S. Vaughan; Assistant: A. Clouston; Hon. Secretary: E. Cautherley.

WEENEN COUNTY HORTICULTURAL SOCIETY. — Committee of Management: A. F. Henderson, C.M.G., F. C. Schiever, G. W. Linfoot, P. J. Nunn, Dr. Brewitt, S. Vaughan; Hon. Secretary: E. Cautherley.

ZULULAND FARMERS' ASSOCIATION.—President: F. W. White; Vice-President: C. E. Symonds. Committee: J. J. van Rooyen, A. W. Symonds, H. T. James, R. J. Ortlepp, J. P. Kokemoer.

ZULULAND COAST FARMERS' ASSOCIATION. — President: G. H. Hulett; Vice-President: C. Hill; Hon. Secretary and Treasurer: F. Brammage, Ginginhlovu.

(The Editor will be obliged if the Hon. Secretaries will supply him with lists of the Executives of their Associations.)

Diamond Drilling.

SOME of the departmental diamond drilling plants are at present disengaged and available for hire for boring for either minerals or water. Particulars as to terms of hire may be obtained from the undersigned.

CHAS. J. GRAY,
Commissioner of Mines.

Trees for Sale.

TO encourage tree-planting, transplants and seeds of forest trees are supplied by Government, so far as in stock, at the undermentioned rates, exclusive of carriage, from the Government Nursery, Central Experimental Farm, Cedara.

Transplants of Eucalyptus, Pines, Acacias, Casuarinas, Cupressus, etc., about 25 trees in each tin, at 8s. 4d. per 100 trees. Trees in separate tins at 1s. each.

Transplants of scarce kinds, larger trees, or surplus stock, when available, will be charged at special rates, which will be furnished on application.

Tree seeds, in variety, at 1s. per packet. Price per pound, which fluctuates, wil be furnished on application.

Package and postage of seed, when required, charged 1s. per lb. extra.

Orders for present or spring delivery should be addressed to the **Forester, Cedara,** and must be accompanied by a remittance in cash or postal order. Cheques cannot be accepted.

T. R. SIM,
Conservator of Forests.

Employment Bureau.

THE Department of Agriculture has received applications from the undermentioned, who are prepared to become assistants or apprentices on farms. The Department will be glad to hear from farmers willing to take young men as assistants, and to place them in correspondence with the various applicants. When communicating on the subject, farmers may refer to the applicants by quoting the numbers in the following list:—

No. 92a.—Englishman, 50 years of age, with varied experience in tea and coffee planting in Ceylon, and also of contract work. Has also been on a Sugar Estate, and has had experience in pig rearing. Salary needed.

No. 94.—Scotchman, who has lived all his life in South Africa, desires employment on farm in connection with stock if possible. Was a Head Conductor during Boer War. Was 2 years with Transvaal P.W.D. as handyman. Produces good references. Desires salary.

No. 95.—German, of respectable appearance, who speaks English fluently, desires employment on a farm. Is 48 years of age, and has been accustomed to farm work, wire fencing, masonry, carpentry, &c. Salary required.

No. 97a.—Colonial, aged 22, bricklayer by trade, speaks Zulu, Dutch, and Hindustan, desires employment as a farm hand. Was on a farm in vicinity of Pretoria for six months.

No. 98.—Englishman, 25 years, desires situation on sheep and stock farm. Had experience of sheep on father's farm in Lincolnshire. Has been four years in Natal.

No. 99.—Englishman, 17, Colonial born, anxious to learn farming. No previous experience.

No. 100.—Englishman, 23, with experience gained in Richmond district, desires to get on to farm further up country. States he is active and not afraid of work. Wage no particular object.

No. 101.—Applicant, 45 years of age, at present a factory manager in Mauritius, desires employment in Natal. Has had 25 years' experience in the cultivation of sugar cane and vanilla. Produces good testimonials. Services are likely to be available shortly owing to failure of the cane crop. Is married, with family.

Rules for Agricultural Co-Operative Societies.

THE Department of Agriculture has for disposal, at the rate of one shilling each, copies of Model Rules for the use of Agricultural Co-operative Societies. Applications should be made to the Secretary, Minister of Agriculture, Pietermaritzburg.

Bulletins Issued by the Dept. of Agriculture.

Single copies may be obtained free (excepting those with price attached) no application to the Secretary, Minister of Agriculture.

No.
1.—"Notes on Fruit Culture," by Claude Fuller. [1902]. *(Out of print).*
2.—"Manures on the Natal Market, 1902," by A Pardy. [1902].
3.—"Insects in an Important Rôle," by Claude Fuller. [1904]. *(Out of Print).*
4.—"Manures on the Natal Market, 1903," by A. Pardy. [1903].
5.—"Weed Circular," by Claude Fuller. [1905].
6.—"Manures on the Natal Market, 1904," by A. Pardy. [1904].
7.—"Tree-planting in Natal," by T. R. Sim. [1905]. *(Price 2s. 6d.)*
8.—"Agricultural Co-operation," by E. T. Mullens. [1905]. *(Out of Print)*
9.—"Potato Culture" by A. N. Pearson. [1905].
10.—"Manures on Natal Market, 1905," by A. Pardy. [1905].
"Agricultural Statistics, Natal, 1904-5." [1906].
11.—"East Coast Fever," by S. B. Woollatt. [1906].
12.—"Manures on Natal Market, 1906," by A. Pardy. [1906].

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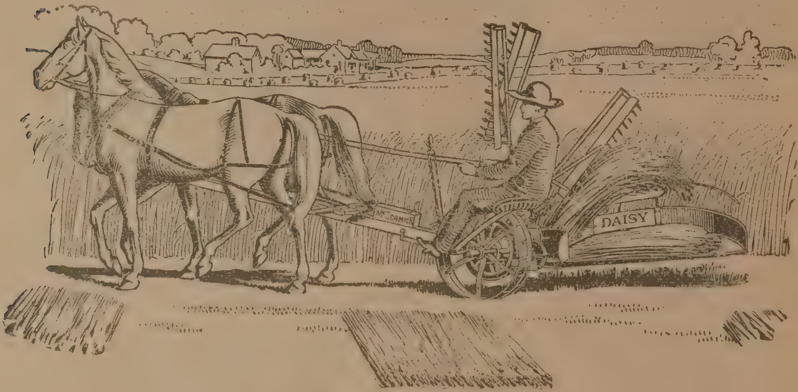

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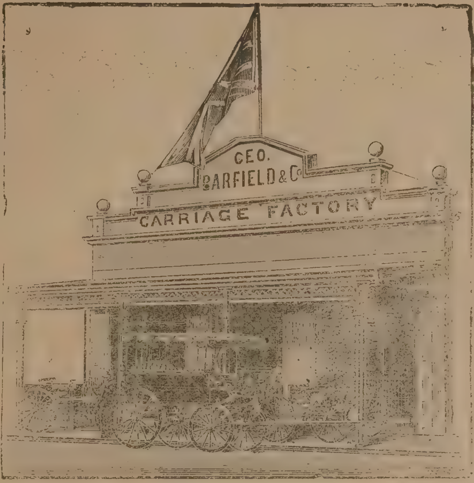

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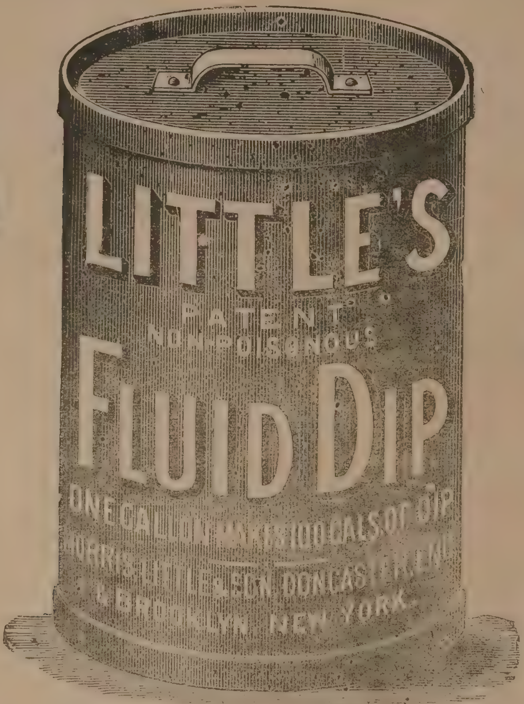

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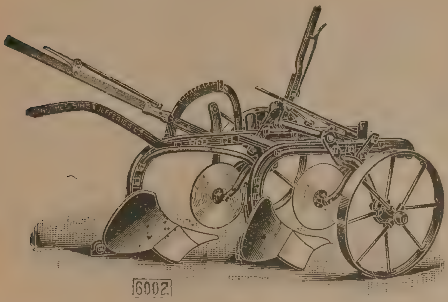

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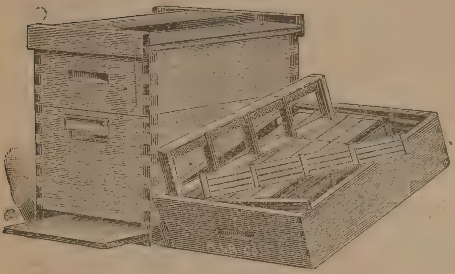

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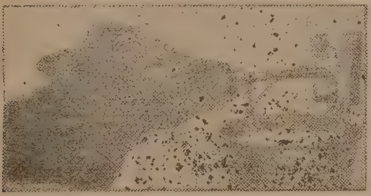

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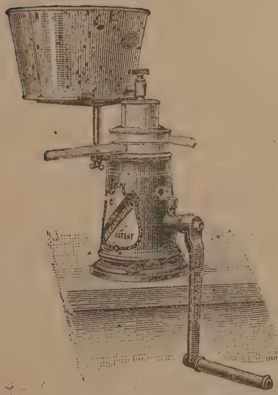

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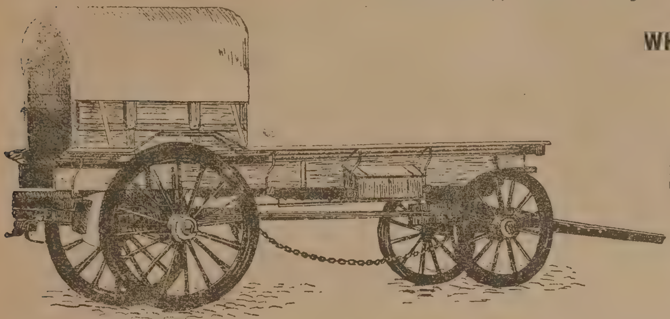

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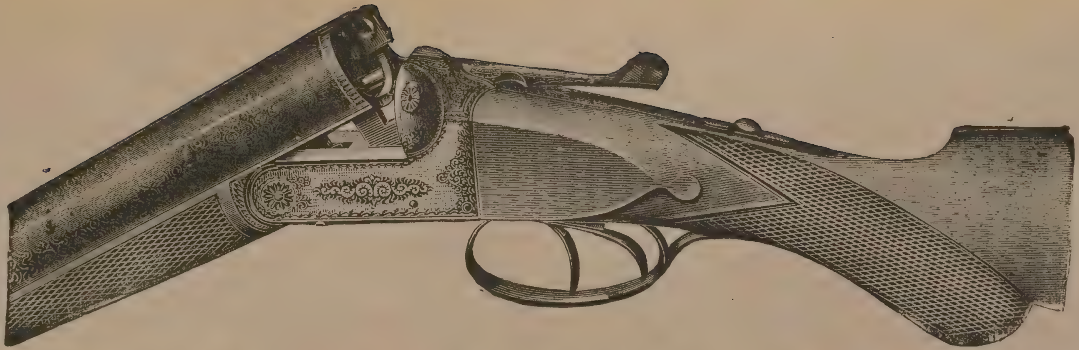

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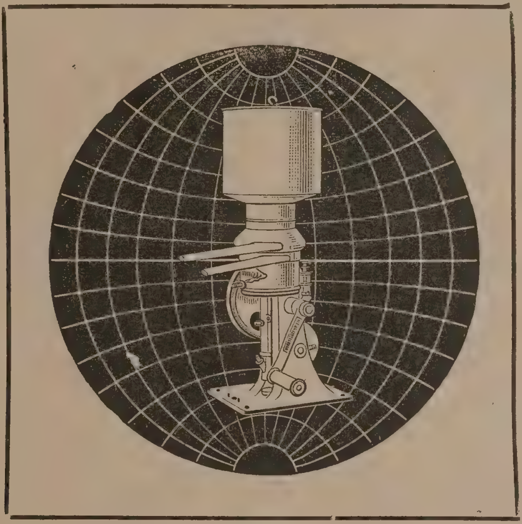

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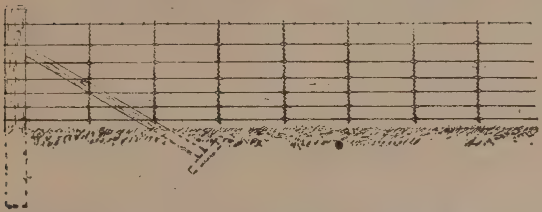

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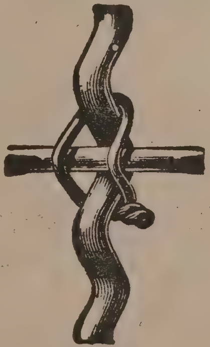

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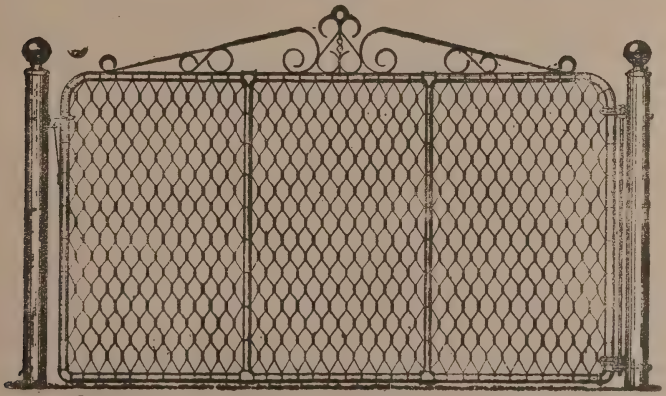

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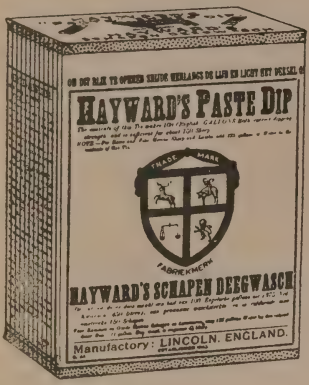
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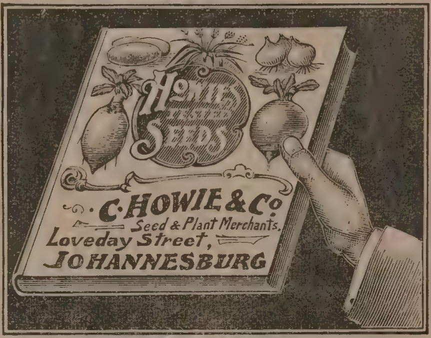
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THE "TIMES" PRINTING AND PUBLISHING COMPANY, LIMITED.

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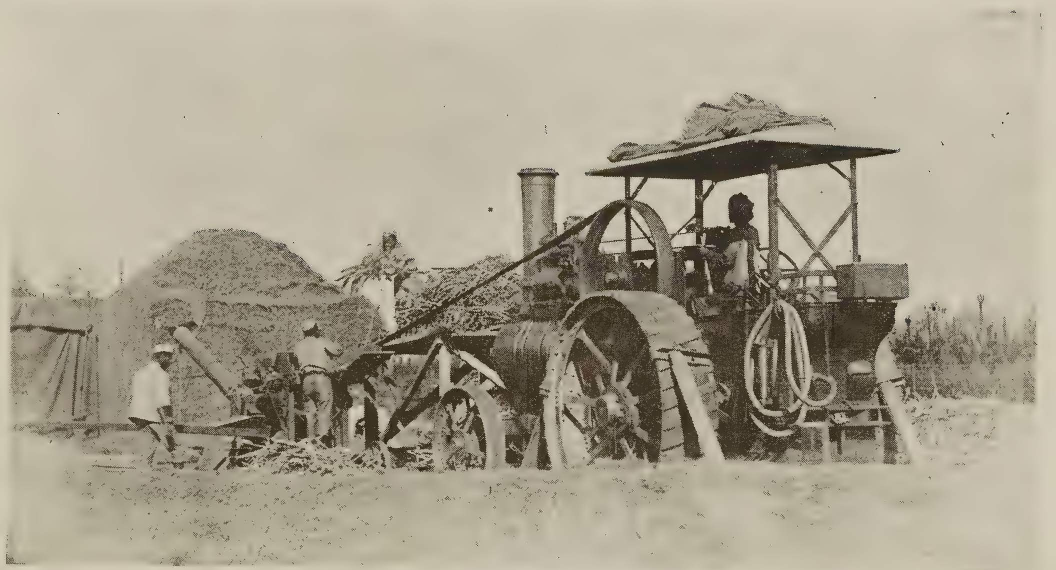

HUSKER AND SHREDDER IN OPERATION.
Central Experiment Farm, Cedara.

VOL. X. NO. 8. AUGUST 23, 1907.

Natal Agricultural Journal and Mining Record.

Winter Feeding of Dairy Cows.

By E. R. SAWER, Director, Experiment Stations.

CHARACTER OF THE ENQUIRY.—Commercial fertilizers are sold on their content of nitrogen, phosphoric acid and potash, and a similar valuation may be made of the common stock foods in accordance with the contained proportions of protein or muscle-forming material, sugars and starches, fats and oils. As in the former case, however, the actual value of such fertilizers in relation to individual crops can only be deduced upon harvest returns, so in the conduct of feeding operations the ultimate criterion is the return obtained in the form of meat, milk, wool, or labour. Tables of chemical composition and feeding standards can only be advanced in acceptable form to the practical stock-owner when supported by concrete results, and it is to the collection of the latter that a series of feeding trials have been directed at our different experiment stations. The subject is often raised at farmers' meetings and in the agricultural press as to the relative values of different feeds, and an effort is being made to supply a convincing answer in the following reports.

FEEDING DIFFERENT CONCENTRATES WITH A UNIFORM ROUGHAGE RATION.

Twelve dairy cows were set aside for this experiment at Cedara and fed for 14 days on a uniform roughage ration without concentrates, and a daily record entered of milk and butter-fat secured. At the end of this time six concentrate rations were introduced and fed for a preliminary period of 7 days to allow the cows to come under the influence of the food. During a further period of 14 days results as tabulated below were secured:—

Roughage Ration.	Concentrate Ration.	Number of Cows.	Yield of Milk during preceding 14 days.	Yield of Milk during preliminary period of 7 days.	Yield of Milk during trial period of 14 days.	Average Butter-fat before trial.	Average Butter-fat at close of trial.	Gain of Milk in 14 days due to concentrates.
			lbs.	lbs.	lbs.			lbs.
10 lb. Chaffed Hay and 20 lb. Sliced Roots	6 lb. Mealie Meal	2	215	112½	273¼	4·1	3·9	58¼
Ditto	4 lb. Mealie Meal 2 lb. Wheat Bran	2	379	202¼	465¾	3·5	3·6	86¾
Ditto	6 lb. Munga or Bulrush Millet Meal	2	224	133½	313	4·5	4·9	89
Ditto	4 lb. Mealie Meal 2 lb. Brewers' Grains	2	196½	105	287½	4·3	4·4	91
Ditto	4 lb. Mealie Meal 2 lb. Cokernut Cake	2	331½	195	459¾	4·9	4·7	128¼
Ditto	4 lb. Mealie Meal 2 lb. Ground Nut Cake	2	248¼	149	368½	4·6	4·7	120¼

It will be noted that bulrush millet (*munga*) meal gave considerably better results than mealie meal when fed in equal quantities, and that the substitution of 2 lbs. of wheat bran or brewers' grains for 2 lbs. of the meal had a beneficial effect. Brewers' grains have a slightly higher value for milk-production than wheat-bran, but considerably less than an equal quantity of the two oil-cakes. The latter, received from the Durban Oil and Soap Works Co., are very worthy of the stock-owner's attention, for the small quantities fed had a most marked influence on the milk-flow, the substitution of 2 lbs. of either cake for an equal quantity of mealie meal resulting in a further average daily yield per cow of 2½ lbs. and 2 1-5th lbs. of milk respectively. In the light of these results, the following examination of these local products by the Analyst of the Transvaal Department of Agriculture will be of interest:

COCOA-NUT CAKE.

"A sample of this material, obtained from Durban, was analysed, and gave the following figures—for comparison I give the average composition of cocoa-nut cake and of 'old process' linseed cake from American analyses:—

	Cocoa-nut Cake.		Linseed Cake.
	A, Durban.	B, Av. American.	Av. American.
Moisture	14·97	10·3	9·2
Ash	8·82	5·9	5·7
Protein	22·63	19·7	32·9
Oil	8·05	11·0	7·9
Carbohydrates	45·53	38·7	35·4
Crude fibre ..		14·4	8·9
	100·00	100·0	100·0

"The figures show the Durban sample to be higher in moisture, protein, and ash than the average of the American samples, though poorer in oil.

"It was proposed by my correspondent to use the cocoa-nut cake as part of the rations for horses instead of linseed cake, of which he informs me he could not get the animals to eat more than about 1 lb. per day each. The cocoa-nut cake, though much poorer in protein than the linseed, will probably prove more palatable and better suited for horses. Investigation with French army horses about 1883, indeed, proved that cocoa-nut cake was superior in feeding value to an equal weight of oats and their substitution for oats, at prices ruling at the time, would lead to a saving of about £2 per year in the cost of keeping an army horse.

GROUND-NUT CAKE.

"A sample of this material, also from Durban, has been examined and yielded the following results—the average of American analyses of the product is also given for comparison:—

Moisture	10·95	10·7
Ash	5·16	4·9
Protein	45·00	47·6
Oil	7·64	8·0
Carbohydrates }	31·25	23·7
Fibre .. .. .. }		5·1
	100·00	100·0

"The Durban sample agrees very well in comparison with the average American one, but is not quite so rich in protein.

"In using a food so rich in protein as ground-nut cake, it is necessary to feed it in small quantities, or digestive troubles may ensue.

"The albuminoid ratio of the two cakes would be (assuming that all the constituents have the same digestion coefficient, which is not necessarily the case):

$$\text{Cocoa-nut cake } \frac{22{\cdot}65}{45{\cdot}53 + (8{\cdot}05 \times 2{\cdot}3)} = \frac{22{\cdot}65}{64{\cdot}04} = \frac{1}{2{\cdot}82} = 1 \; : \; 2.82$$

$$\text{Ground-nut cake } \frac{45{\cdot}00}{31{\cdot}25 + (7{\cdot}64 \times 2{\cdot}3)} = \frac{45{\cdot}0}{48{\cdot}82} = \frac{1}{1{\cdot}085} = 1 \; : \; 1.08$$

"Both these foods, therefore, require to be mixed with considerable quantities of starchy foods in order to form a ration with an albuminoid ratio of about 1 : 5, which is probably best for hard-worked horses.

"The money value of the two foods, adopting the rough method of calculation described on pp. 818 and 819, Vol. IV., No. 16, of this *Journal** would be:—

"For cocoa-nut cake:

Carbohydrates and fibre, 45·5 @ 2s.	91·0
Protein, 22·63 @ 5s.	113·15
Fat, 8·05 @ 5s.	40·25
	244·40

i.e., £12 4s. 5d. per short ton.

"For ground-nut cake:

Carbohydrates and fibre, 31·25 @ 2s.	62·5
Protein 45·00 @ 5s.	225·0
Fat, 7·64 @ 5s.	38·2
	325·7

equals £16 5s. 8d. per ton.

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* Transvaal Agricultural Journal.

"These figures are undoubtedly too high, because, in the above calculation, we have assumed all the constituents to be digestible, which is not the case, particularly with the 'fibre.'"

While agreeing that a "home-grown" ration for all stock is very desirable, one may urge that this enterprise is very worthy of support, and warrants an extended cultivation of ground-nuts.

(*To be continued.*)

Notes and Comments.

AN ERROR.—By a printer's error the descriptions of two of the illustrations appearing in last month's *Journal* became transposed. The illustrations in question are those facing pages 764 and 772, respectively. The wording below the former illustration should have been placed below the second illustration—that facing page 772—and *vice versa.*

"TOBACCO CULTIVATION IN SOUTH AFRICA."—Through pressure of work Mr. Sawer, Director of Experiment Stations, has been unable to send in his instalment of his series of articles on "Tobacco Cultivation in South Africa" in time for inclusion in the present issue of the *Journal.* A Dutch translation of the last month's instalment will be found elsewhere in this issue.

VISITS TO READING POULTRY FARM.—The Agent-General, in a recent letter, states that, if at any time Natalians visiting England would like to inspect the Poultry Farm and Experiment Station in connection with the University College, Reading, Mr. E. Brown, Secretary of the National Poultry Organisation Society, will be pleased to arrange for them to do so. Mr. Brown's address is 12, Hanover Square, London, W.

TRANSVAAL MEALIE PROSPECTS.—Reporting to the South African Commerce and Manufacturers' Record, on the prospects of mealies in the Transvaal, the Keeling Agency, Ltd., Johannesburg, state that, from a very large number of reports to hand it would appear that the crop in the whole of the Eastern portion of the Transvaal is larger than that of last year. Reports from the Northern Transvaal show, on the whole, that the crops are at least equal, if not better, than those of last year. The Western Transvaal, however, suffered very considerably from locusts, and practically all reports to hand advise that the mealie yield is insufficient for the requirements; this has also been the case, it is stated, on the whole of the Witwatersrand.

NATAL PRODUCE IN JOHANNESBURG.—Mr. Alfred Webb, produce agent, P.O. Box 2342, Johannesburg, informs the Department that he is in a position to place large quantities of honey, beeswax, tallow, almonds, walnuts, and fruit of all kinds. Farmers in Natal having quantities of these commodities to dispose of, would do well to place themselves in communication with Mr. Webb.

MOVEMENT OF CATTLE IN DURBAN COUNTY.—The Minister of Agriculture has authorised the movement of cattle within the following area, upon permission in writing being first obtained from the local Permit Officer. The boundaries of this area are:—North, Krantzkloof from Wyebank Station to River Umgeni; south, Scheferman's and Westermeyer's fence from River Umgeni to Main Road to Durban; east, River Umgeni from Krantzkloof to Scheferman's boundary fence; west, N.G. Railways from Wyebank Station to Palmiet Stream, thence along Palmiet Stream to Westermeyer's fence thence along fence to Main Road to Durban.

MR. ALBERT KELLY.—Mr. Albert E. Kelly, who has, for some time, served as a technical and clerical assistant to Mr. Claude Fuller, the Government Entomologist, has recently received an appointment as Assistant Entomologist in the Orange River Colony. At the beginning of August he severed his connection with the Natal Department of Agriculture to take up his duties in his new sphere of activity. Upon the occasion of his departure, his fellow-officers took the opportunity to make a presentation as a token of their friendship and good wishes. His many friends will wish him every success in his new sphere of work. Mr. Kelly was last June elected a Fellow of the Entomological Society of London; and we take this opportunity of congratulating him on the honour which has been conferred upon him.

MADEIRA FRUIT TRADE.—Discussing the fruit trade in his Report on the trade and commerce of Madeira in 1906, H.M. Consul (Capt. James Boyle) says that a most flourishing fruit trade, which was once carried on betwen Madeira and Great Britain, has collapsed and disappeared, owing entirely to the high capital value of all land in that island and the very costly form of cultivation carried on there, and those interested can no longer compete with the same class of fruit exported from the West Indies and Costa Rica, and also, to a more limited extent, from the Canary Islands. The bulk of the bananas grown in Madeira are sent direct to Portugal. A very small quantity of French beans is sent weekly to London. The cultivation of fruit in Madeira is now, it is stated, almost extinct, owing partly to a variety of insect pests and to the universal planting of sugar cane, which gives a much more remunerative crop.

Mealie Export from Transvaal.—The Johannesburg correspondent of the *Natal Witness* reports that there is a movement on foot to export from the Transvaal some 100,000 bags of mealies during the present season. "After much pressure" the Natal, Portuguese, and Central South African railway systems have, he states, come to an arrangement whereby the coastward rate on mealies for export will be considerably reduced. The rate per ton from Pretoria and Volksrust is fixed in both cases at 13s. 4d. Coupled with the reduction of railway rates, there is also a reduction in sea freight to 15s. per ton, so that it is now apparently possible to forward a bag of mealies from Pretoria via Delagoa Bay to London for something like 2s. 6d.

A S.A. Condensed Milk Factory.—The news of the establishment of a condensed milk factory in the vicinity of Port Elizabeth will be received with pleasure by all South Africans. It is a sign of better things that such an attempt to establish a local industry of that nature should be made; and it is to be hoped that, in spite of the many difficulties which will have to be overcome, the new venture will succeed in firmly establishing itself and increase its production. If a condensed milk industry can be established in South Africa on a really firm basis, much will have been done in the direction of stopping the flow of money out of the country. Last year the imports of condensed milk amounted to 27,341,774 lbs., of a value of £471,100. Of this quantity £63,488 worth was entered for consumption in Natal. Quotations for the new South African brand have been given at the rate of 5s. per dozen tins on rail at Port Elizabeth. Those interested should communicate with the Commercial Agent of the Agricultural Department, Capetown.

Agricultural Credit in Ireland.—There are now about 240 cooperative agricultural credit societies in existence in Ireland. During the year 1905-6 there was a decided increase in their reserve funds, which, in the case of several of the older societies, now amount to £100. During that year, the Irish Department of Agriculture and Technical Instruction continued to advance loans of sums not exceeding £100 to newly-organised banks, charging interest thereon at the rate of three per cent. per annum. About £60,000 was issued for the purpose of enabling the borrowers to purchase live stock, seeds and manures, or to hold over their stock until sales could be effected at a greater profit. In the last Annual Report of the Irish Department of Agriculture, it is stated that these credit societies are generally treated favourably by the joint stock banks, from which a considerable share of their local capital is derived; thus they provide a satisfactory medium by means of which the very poor can utilise the capital of the large banks at a moderate cost.

ENQUIRY *re* NATAL PRODUCE.—The Department of Agriculture has received an enquiry from an East London firm who are much interested in South African industries and South African produce, and who desire to get into communication with manufacturers and producers, in Natal, of such lines as may be suitable for inter-Colonial trade. Readers of the *Journal* who are ready to do business in local products with Cape Colony should communicate with the Department, when the name and address of the firm in question will be furnished to them.

E.C.F. INFECTED AREA.—By order of the Minister of Agriculture, a zone of country has been defined around the E.C.F. infected farms "Acol," "Kleinfontein" and "Brakfontein," Klip River County, with the following boundaries:—On the north, by the boundary between the farms Ruigtefontein and Kleinfontein to its junction with the main line of railway, thence in a southerly direction along the eastern side of the main line of railway to the railway bridge across the Sunday's River, thence in a south-easterly direction along the Sunday's River to the Helpmakaar Road Drift, thence in an easterly direction along the Helpmakaar Road to the point where the road intersects the western boundary of the farm Uitvlught, thence in a northerly direction along the western boundaries of the farms Uitvlught and Klipfontein to its junction with the farm Kleine Waterval, thence to its junction with the boundary of the land known as "The Strip," and the farm Ruigtefontein. The removal of all cattle from this zone has been ordered, and no cattle will be allowed to enter or be in that area.

A DESTRUCTIVE WEED.—The Assistant for Seed and Plant Experiments of the Transvaal writes a warning paragraph in the *Transvaal Agricultural Journal* regarding an injurious weed, known botanically as *Tagetes minuta*, L. This weed belongs to the Marigold family, and, like other members of that family, is remarkable for its strong, pungent smell. It is described as "a tall-growing, feathery plant, usually from three to four feet high, and bearing a mass of small yellow flowers in terminal panicles." It is stated that this weed has made its appearance in the neighbourhood of Volksrust and Charlestown, and shows every sign of becoming a cause of serious trouble. Shedding seed in enormous quantities, it is likely to come up thickly in the spring and cause much damage by smothering out the young corn crops. "We are further informed that it does not burn readily, and, therefore, the only method of eradicating it appears to be by ploughing it in or by continual hoeing while the plants are young. Owing to the fact that it has established itself at Charlestown, just across the border, the difficulty of dealing with the plant is increased, but steps are being taken with a view to arranging a joint scheme whereby the spread of *Tagetes minuta* may be checked."

INDIA RUBBER PRODUCTION IN BRAZIL.—In an account of the discovery, sources, supplies and uses of india rubber, in the *American Review of Reviews,* Mr. W. B. Ivins says that the labour problem in the production of india rubber is a crucial one, both in the great Amazon region of South America and the Congo Free State. "The mortality in the State of Amazonas, in Brazil, for example," he says, "corresponds with almost diabolical exactness to the number of tons of rubber produced, so that it is said that every ton of Brazilian rubber costs a human life, and although there are no such atrocities in Brazil as have been charged against the Congo, it is nevertheless true that the labourers who are brought into the rubber fields from the coast do not average more than three years of life, and are, if not in law, at least in fact, subjected to hardships never known or endured by the slaves in the United States, or even by the slaves in the coffee countries of Brazil. The greed of man as expressed in terms of rubber has proved itself almost fiendish, and the requirement for this necessity of life probably holds more men to-day in abject and irremediable slavery than any other field in the world's work."

APICULTURE.—Though by no means the first bee enthusiast in Natal, Miss Ada Pullinger may perhaps claim to be the first to go in extensively for apiculture, having just established an apiary on a business scale on the South Coast, at Umkomaas. We learn from the *S.A. Poultry Journal* that Miss Pullinger started bee-keeping at Malvern some two years ago, and has become more and more interested in bees ever since. Leaving some hives at Malvern to look after the mango and orange blossom, Miss Pullinger has removed the larger number of colonies to Umkomaas. After the preliminary work of clearing the undergrowth (leaving the taller trees to form sufficient shade for the bees) on a hillside overlooking the river and but a short distance from the station—the site selected for the establishment of the apiary—the more or less difficult task of moving the bees was performed, safely but not without adventure. The first ten hives passed Sea View in safety, but before South Coast was reached the bees had become restless; they objected to the flitting, we are told, and maligned the N.G.R. in the conventional way; and "by turning their bodies sixteen times with a screw-like motion they found they could force an entrance through the perforated zinc." Difficulties ensued; but finally muslin covers were adjusted, and Umkomaas was reached at night-fall. Practically all the honey, Miss Pullinger explains to visitors, is for Johannesburg; she has no intention of placing any on the local markets. It would be interesting to see such an industry firmly established here on really profitable lines and on a large scale; and the good wishes of our readers will surely accompany Miss Pullinger in her efforts to prove that apiculture can be established in this country on a successful basis, Banana Cultivation in Egypt.—According to an article in the *Gardener's Chronicle,* growers of bananas in Egypt rarely realise less than £60 clear profit per annum per feddan (a little over an acre); and from one plantation of 25 feddans in the Province of Galoubieh, the owner has this year made a profit of over £2,000. Yet many bananas are yearly imported into Egypt; and there is an argument additional to that of the existence of a home market, for the institution of a banana industry in that country, namely, that Egypt is more favourably situated than any other country for a banana trade in the Mediterranean, Adriatic and Black Sea ports. The Chinese banana, which fetches the highest price in the European markets, thrives "exceedingly well" in Egypt, and bears crops equal in weight to any produced in the West Indies or Canary Islands. Clumps planted ten feet apart annually produce four bunches of fruits containing from eight to ten hands each.

A Jam Factory for Zululand.—A laudable project, and one deserving of a full measure of support, is that brought forward by Mr. W. A. Vanderplank at a meeting of the Eshowe District Farmers' Association held on the 29th July, for the establishment of a jam, canning and preserving company on co-operative principles. Mr. Vanderplank's proposal is to form a co-operative society with a nominal capital of £4,000. On this capital a call would be made of 2s. 6d. per £1 share, providing cash to the amount of £500, and leaving a liability of £3,500 on the shares. Government should, Mr. Vanderplank suggests, be approached to make a loan of £1,500, taking as security the Society's plant, etc., with further security of the £3,500 uncalled for capital. In its early stages the factory would deal chiefly in small fruits, such as Cape gooseberries, grenadillas, guavas, raspberries, citrus fruits, pineapples. These are all growing in the district, it was stated, and would provide something for the factory to go on with. Fruit should be grown and supplied to the factory, Mr. Vanderplank suggests, at an average price of about 1d. per ℔., which would mean £9 6s. 8d. per ton of 2,240 ℔s. All members of the society should undertake to grow a certain quantity of fruit during the ensuing season. "The undertaking," Mr. Vanderplank says, "would be a modest one, within our means and suited to our soil and climate. It will open up a field for numerous small cultivators and enable the man with a few pounds capital to make his living off 10 acres of land. Advantages would also accrue to the town which, if they were too small to make any difference in a big city, would certainly be felt in our small community." After the reading of Mr. Vanderplank's paper, Mr. H. C. Hulett proposed, seconded by Mr. Thole, "That a preliminary committee be appointed to go into the matter and report to the association." This was carried, and the following gentlemen were chosen to constitute the committee:—Messrs. W. A. Vanderplank, G. H. Hulett, Dr. G. K. Moberly and Mr. T. Parkins.

THE GOVERNMENT ABATTOIR.—The abattoirs which were erected recently by Government in Maritzburg to deal with cattle from East Coast Fever infected and other areas, are apparently turning out the success which was anticipated. Mr. A. R. Burford, the manager of the Abattoir and Cold Stores, informs us that between seven and eight hundred cattle were dealt with during July, besides numbers of sheep and pigs. Consideration has, of course, to be taken of the fact that the winter is well advanced, and that, at this time of the year, even in normal times prime cattle are comparatively scarce. Yet, in spite of this, large supplies of cattle are coming forward; and Mr. Burford anticipates that an even larger number will have been dealt with by the end of the current month. A pleasing result of the existence of these abattoirs and the facility they give for the clean and satisfactory handling and despatch of slaughter cattle, is the fact that there is now practically no imported beef on the Natal market. The quantity of imported beef consumed in Natal during the past six months has been very small; in fact, Mr. Burford feels certain there is little or none of the imported article in Maritzburg at the present time, and only a small quantity in Durban; whilst in the country towns it is unknown. Questioned as to the effect upon the market of the present system of wholesale slaughtering, Mr. Burford states that beef of fair quality is realising reasonable prices, and that there is, as yet, no slumping effect apparent.

N.S. WALES AGRICULTURAL STATISTICS.—Preliminary tables dealing with the agricultural and live stock statistics of New South Wales for the year ended March, 1907, have just come to hand. The total area under all crops is returned at 2,826,617 acres, which, although a decrease of 13,618 acres as compared with the acreage of the previous year, is an increase of 1,004,788 acres since 1898. Nearly 34 per cent. of this area was under wheat (for grain), 1,866,253 acres being devoted to that crop. Maize monopolised 178,197 acres. Lucerne was planted to the extent of 45,964 acres. There were 4,942 acres of grape vines for wine-making purposes, and 2,912 for table use. The average yield per acre of mealies is given as 30·9 bushels, that of wheat 11·7 bushels, oats (grain) 24·9 bushels, oats for forage 1·4 tons, barley for forage 1·4 tons, lucerne 1·9 tons, potatoes (early crop) 2·6 tons. For the purpose of comparison with Natal yields of some of these crops, the reader is referred to page 774 of last month's *Journal.* At the end of 1906 there were in the State 537,427 horses, 2,549,758 cattle, 44,132,421 sheep, and 243,370 swine. During that year 57,477,000 lbs. of butter were turned out, as well as 5,375,000 lbs. of cheese and 11,823,000 lbs. of bacon and hams. There are 37,306 productive, besides 11,964 unproductive bee-hives in the State; and the quantity of honey produced during the year ended March, 1907, was 1,907,744 lbs., the average yield of honey per hive being 51·1 lbs. In addition 34,690 lbs. of beeswax were produced.

THE WORLD'S TEA CONSUMPTION.—Messrs. Brooke, Bond & Co., the wholesale tea dealers, in their report upon the consumption of tea during the past year, state that the consumption has increased during the year in the United Kingdom as well as abroad. The habit of drinking tea is certainly gaining ground, they remark, on the Continent. In the fashionable watering-places in France, tea is to be had at most of the confectioners' shops, and is drunk not only by English and American visitors, but also by the French. Imports into Germany have increased after the duty was reduced in March, 1906. Tea seems to be steadily growing in favour in that country and becoming part of the regular dietary. In many families it is always served with the evening meal. Imports of British-grown tea into Russia increase steadily. This is entirely owing to the good quality of the tea and to the enterprise of British dealers who, in spite of all difficulties, have kept their tea well before Russian blenders. The United States took more British-grown tea last year, though imports of all teas fell below those of the two previous years. Indian and Ceylon teas are being very well advertised in various ways—by sampling, by the establishment of tea-rooms, by newspaper advertising, through the post, by assistance given to charity bazaars, and in other ways—with satisfactory results. Consumption also increased last year in Australia, New Zealand, South America and other parts of the world.

THE ARBOR DAY MOVEMENT.—The Arbor Day movement is one that has excited little interest—even if its existence has been at all widely known—in Natal. In Cape Colony and the O.R.C. an annual arbor day is recognised and the occasion is made a general holiday. Apart from the good such an annual observance does in the direction of the inculcation of a certain love of nature in the minds of children, there is a national benefit which is to be derived from an annual planting of numbers of trees in the various towns, villages, and districts of a country. Mr. Sim's paper on "Man's Influence on Climate" in last month's *Journal* brings forcibly home to us the value of afforestation, and the necessity, not only for the judicious conservation of such bush and forest as still remains to us, but for the setting aside of fresh areas of forest trees. The adornment of our streets, our farmsteads and our landscapes with carefully selected trees will have more than an aesthetic value: they will have a highly beneficial effect upon the general climatic conditions of the Colony in the future—an effect that must be recognised as a most important one not only by agriculturists but by all sections of the population. We commend the matter to the consideration of agricultural associations. In concluding a statement on Arbor Day which he has recently issued to the school children of the United States, President Roosevelt says: "A people without children would face a hopeless future; a country without trees is almost as hopeless; forests which are so used that they cannot renew themselves will soon vanish, and with them all their benefits. A true forest is not merely a storehouse full of wood, but, as it were, a factory of wood, and at the same time a reservoir of water. When you help to preserve our forests, or to plant new, you are acting the part of good citizens. The value of forestry deserves, therefore, to be taught in the schools which aim to make good citizens of you."

CO-OPERATIVE MARKETING.—History repeats itself, indeed. What has happened—and, for that matter, is happening now—in Great Britain with regard to foreign competition in food supplies is to-day happening in Natal. Recently the *Natalian* called attention to the circumstance that Australian butter was being sold in the City at a lower price than the home-produced article; and the following week (2nd August) was "still further astonished" to find that butter from the Argentine Republic was being retailed here at 25 per cent. less than our Natal farmers can produce it. "What is the reason for such an extraordinary circumstance?" the *Natalian* asks. "If there are any two items in our domestic economy which we should, under no circumstances, have to import, butter and milk are surely those two items, and yet we find that condensed milk and foreign butters are the rule, instead of the exception, at our breakfast and tea tables. Instead of importing them, Natal should be exporting such articles, and our farmers should blush for very shame at seeing such items in our lists of imports." It is, certainly a strange situation, but it may be described in brief as a result of individualism. It is want of organisation on the part of the producer that has brought about here, as it has done under very similar circumstances in England, such a state of things. How can any reasonable producer ever hope, in these days of competition, to profitably market his stuff when he ignores the very existence, economically, of his neighbours, and consigns his butter or his eggs to town in such absurdly small quantities as is the present vogue? Overseas, by combination, proper grading and packing, and marketing in large quantities, and by carefully studying market and other conditions, farmers are in a position, not only to supply the local demand, but also to place their products on our own markets at a price that will successfully compete with home-made stuff. This is obviously the condition of things. Man for man, our farmers are at heart no more backward than those of other countries; and the prosperity which characterises some other countries is not the result of any extraordinary amount of individual genius on the part of the farmers, but is more likely the outcome of a set of economical and other conditions that have, in the case of Natal, either been absent or whose good effects have been nullified by other sets of conditions acting in contrary lines—instance our famous stock diseases, and locusts and other insect pests. It is co-operation that is wanted; and that is the answer to the *Natalian's* question, "What is the reason for such an extraordinary circumstance?" We can do little—save by protective duties or a system of State bounties, neither of which is feasible at the present time—to undersell foreign butter and milk, not to mention other commodities, until our farmers grasp the significance of the fact that co-operative marketing is the only practicable means of supplying the home demand with home produce. Following on the experience gained in the adoption of such methods should come a large and increasing export trade. We may fittingly conclude with the final sentences of the *Natalian* article: "There is a most extraordinary penchant among Natalians to buy from abroad, and so long as that tendency exists so long shall we remain an impoverished community. It is not only that we waste hard-earned money in this way, but we actually prevent local industry. Such items in our productive and industrial powers may be small, but we should remember the old Scottish proverb that 'every mickle maks a muckle,' and in every branch of commerce we should patronise our own productive capacities."

EARLY-MATURED CATTLE.—What is termed "baby beef" has secured a firm hold on the United States market, as supplying the very best class of meat. The term is one given to early matured cattle thoroughly fattened and ready for slaughter at from twelve to twenty-four months old. The growth of such a beast is artificially promoted by continuous heavy feeding with the object of securing the maximum amount of beef in the shortest space of time. The principal advantages to be derived from the production of these early matured cattle are stated to be (*a*) the quick returns on the capital they represent; (*b*) the greater demand and better prices; and (*c*) the greater amount of meat produced per pound of food consumed. A Circular of the U.S. Bureau of Animal Industry states that early maturity is not so much a matter of breed as of type. Early maturity is generally found in animals that combine a good feeding and assimilative capacity with a certain fineness of quality. While early maturity is not entirely a matter of size, it is most often found in individuals a little smaller than the average of the breed. Good specimens have a compact form, fine bone, soft, pliable skin, and good digestive capacity, the latter being indicated by well-sprung ribs, great depth of body and wide chest. With regard to fattening, it has to be remembered that a calf cannot utilise coarse fodder to any extent during the first six months of its life, so that its food must be confined to milk and grain. Young calves which receive liberal quantities of whole milk make rapid gains and get very fat, and this fat is, on the whole, very economically produced; whereas calves that are allowed to get thin during the first six months of their lives generally require a long time to get over the check. Where early maturity is desired such a system would, of course, be disastrous. The fattening should begin with whole milk at birth and be continued until the animal is mature and ready for slaughter. It has been found most satisfactory to permit the calves to run with their dams from four to six months. As the digestive system develops and solid food becomes necessary, grain should be added, the quantity being gradually increased so that when weaning time comes the change is less sudden, and a check in growth or a loss in flesh is less likely to occur. An alternative system is to allow the calf to run with the cow for several weeks, after which they are separated, the calf being allowed to suck three times daily and the cow stripped after the calf has had its fill. This permits a more gradual transition at weaning time, as one of the suckings may be discontinued when the calf is about three months old, another when it is about five months old, and the third when it is six months old, by which time the calf will have become accustomed to eat grain and to drink water. The calf can also be fed with whole milk from the pail. The calf should be so thoroughly accustomed to the use of grain when weaning time comes that milk can be discontinued without any check to growth. From this point the key to the successful production of early matured beef is to hold the flesh already gained and to continue its rapid and steady growth. To induce calves to eat the greatest possible amount and yet keep their appetite keen it is necssary to feed them regularly at stated times every day, as stock will become accustomed to eat at certain hours and will often come to the trough at that time through force of habit, though they may not be particularly hungry. They should be fed more frequently than those nearly mature in age. The grain should be given in two or three feeds daily. If it is given mixed with chopped fodder, it is probably better to give three meals daily, but if kept on pasture two meals of grain is probably sufficient after the first six or eight months. Water and salt should be accessible at all times.

S.A. TOBACCO FOR NEW ZEALAND.—The *Transvaal Agricultural Journal* for July states that enquiries have been received from New Zealand for a good light grade of cigarette tobacco, packed in a suitable form for the retail trade. "There already exists a considerable demand for this from the various cigarette factories in South Africa," the *Journal* comments, "so that, with an evidently widening market, the cultivation of such a class of tobacco should be well worth the attention of planters."

A UNITED STATES ANT PEST.—In a circular issued by the Louisiana Crop Pest Commission, attention is called to the so-called "New Orleans Ant" (*Iridiomyrmex humilis,* Mayr.), an introduced insect enemy that promises within a few years to do enormous damage to the agricultural interests of the State of Louisiana, and which at the same time is likely to present a difficult problem for solution. This ant is already a bad household pest in New Orleans and Baton Rouge, and has already spread to the towns of Alexandria, Lafayette and St. Charles, and to adjoining territory. It cares for and permits the increase of almost every species of plant louse and scale insect, and, as the indirect result of its presence, thousands of trees and plants in the City of New Orleans have already been killed. Moreover, the ant does not confine itself to facilitating the increase of other injurious insects, but is itself injurious. During the present spring it has destroyed the entire prospective orange crop at Audubon Park, by eating the fruit buds, and last year it was the cause of heavy losses to orange growers in various parts of the State. It is also guilty of causing the increase of an insect very injurious to sugar cane, a species of *Dactylopius.* Unless measures are found for the control of this pest, the orange industry of the State, it is said, is doomed; and eventually the success of the sugar cane industry is likely to be threatened by it. All fruit industries will suffer from its presence. Further, as it destroys or drives out all native species of ants, its appearance in the cotton fields is not unlikely to result in increased damage by the boll weevil, for the most active enemy which the boll weevil has in Louisiana is the small "fire ant" (*Solenopsis geminata*, Fab., var.), and the latter may possibly be exterminated or driven out by the "New Orleans ant."

South African Products in England.—The Secretary of the Capetown Chamber of Commerce (Mr. E. J. Cattell) has forwarded to the *Cape Times* a letter from Messrs. H. E. Jones and Albert Douglass, the joint managers of the Liverpool Colonial Products Exhibition, regarding the placing of colonial products on the English markets. The letter, which may be of interest to readers of the *Journal*, runs as follows:—"Judging by the phenomenal success of our four exhibitions of Colonial produce in Liverpool, we have come to the conclusion that with judicious handling there is a much improved demand for Colonial goods, which can be brought before the citizens of Great Britain at a competitive price. We have for many years advocated through the press of this country a greater measure of support for commodities supplied by Colonial houses, and we are of opinion that the time has now arrived when a remunerative market can be secured. We are so strongly of this opinion that we are open to accept agencies for Colonial houses in Great Britain on equitable terms, and shall be pleased to hear from any of your members or traders in your Colony who are anxious to open up or extend their trade in the United Kingdom. We would ask them to send us full particulars, also samples of their goods or manufactures, and to state at the same time the best terms they are prepared to offer, so that we can go into the matter very minutely, and advise them as to their prospects of business. We shall be much obliged if you will assist us in this national undertaking, by giving the contents of this communication as much publicity as possible." The offices of the Liverpool Colonial Products Exhibition are situated in 14, Dale Street, Liverpool. The patron of the Exhibition is H.R.H. the Prince of Wales; and the President is Sir Alfred L. Jones, K.C.M.G.

S.A. Produce Exhibition, 1907.

REPORT ON THE NATAL EXHIBITS.

CONDITIONS ESSENTIAL FOR SUCCESSFUL EXPORT.

Mr. T. R. Sim (Conservator of Forests), who represented Natal at the recent South African Products Exhibition in London, returned to Natal towards the end of May. The following is his report to the Minister of Agriculture.

After discussing the arrangements for holding the Exhibition, and similar matters, Mr. Sim goes on to say:—

Taking the Exhibition as a whole, Natal held its place creditably. The space allotted to Natal and the Transvaal together was equal to that held by Cape Colony, Rhodesia occupying a semi-detached room near Natal, while the Orange River Colony had a similar annexure near Cape Colony. The products of any one Colony were kept together, consequently grain, wool, fruit, tobacco, and each other general product was to be found in five different parts of the Hall. The judges and experts usually reported on the merits and comparative value of the exhibits of each Colony separately at first, and then in comparison with those of other Colonies. In view of the expected publication of their report, it would be out of place for me here to give any indication of my own opinions further than to say in general terms that the produce more or less fits the London market, but the expected price does not. London is the great leveller of prices for goods from all parts of the world, and until senders are prepared to accept London prices there can be nothing but disappointment, in sending goods there. For instance, the mealies shown by Mr. John Moon and Mr. Bosse were much admired, and large sales could have been effected on these samples at London price, but that at the time was about 21s. per quarter (480lbs.), or, say, 8s. 10½d. per muid delivered there in full 4-bushel bags, while there was an evident dread that stock might prove not up to sample, pit mealies and mealies subject to weevil being refused almost at any price. So also with tea, sugar, syrup, meal, arrowroot, monkey-nuts, castor-oil, beans, cheese, butter, etc.: each was in demand at London price, but in each case that price was lower than the price current in the Colony, and consequently not up to expectation. So long as the demand in the Colony or in South Africa is sufficient to absorb all the produce grown of any particular article, the market for that article is evidently local, and the best price is likely to be in the Colony. This was fully recognised by the Natal Government when at first it declined to take part in the

Exhibition on the ground that the Colony is not yet in the position to offer produce in quantity abroad, except mostly in the lines in which regular channels of export already exist. But, lest absence should give the impression that Natal *could not* produce, it was finally decided to take part, and to show that Natal is capable of producing a vast variety of articles, in really good form; and that the extended culture of these for local consumption is likely to be remunerative (since local prices rule high) until over-production for local supply ensues, and that even thereafter a less fluctuating value, based on London price, is assured, which is as likely to be profitable in this Colony as in other producing countries, if systematically worked with best kinds and methods.

And in this respect participation in the Exhibition has been fully warranted. The Natal display was greater in variety than that from any other Colony, because inclusive of tropical coast as well as up-country produce. This, too, was made up of staple products, and was almost clear of the misleading little exhibits which can only be produced in small quantity, or for which the world's demand is likely to remain insignificant. The individual exhibits were also fairly representative of what Natal can produce under present conditions of culture and treatment, and were not specially worked up for exhibition purposes, consequently criticism contained in the reports may be accepted as fair criticism on Natal's whole product of that kind, as viewed from the London point of view. The only cases in which this comes to have comparatively little value is in reference to such products as timber, etc., which are never likely to be shipped thither, and concerning which the experts frankly expressed their inability to do other than give a general opinion on suitability for English work in special lines, of the kinds submitted, and that it was beyond their scope to deal with African uses or values for local utilisation.

Some points of interest brought out in general conversation with the judges and experts may, however, be worth mention. For instance, in regard to

NATAL TEA.

This came as a surprise alike to Mincing Lane men and to the public. They had not previously heard of Natal tea, and were exceedingly surprised at the quantity produced, and at the progress the industry is making. And though, as critics, they naturally felt themselves bound to express criticism on the product submitted, and to point out rather its faults and shortcomings than its perfection, they all admitted that the product was inherently first-rate, but that the treatment accorded was not quite that to which London was accustomed. Further, they appeared to agree, with so many degrees of classification as were represented from Natal, it would be useless to attempt bringing Natal tea before the public under that name unless many thousand tons of each grade were available, its present use being rather for blending with other teas so as to produce a uniform quality maintainable in quantity at all times.

This then involves selling bulk into the hands of blenders rather than the establishment of agencies at which the maintenance of an adequate supply of any brand would be a difficult matter at present.

In regard to

SUGAR,

it was pointed out that the buying public take no interest whatever in whether sugar is the product of beet or of cane, and consequently the beet sugar rules the market, and the products sell on nearly equal terms. There was an objection raised, too, that all the ordinary crystallized sugar shown from Natal had a tendency to absorb or develop moisture, greater than that of Home-made sugar. Possibly this was a result of shipment.

In

TOBACCO

there was absolutely no enquiry for the rougher leaf-forms shown; not even for snuff or extract did they appear to be worth the duty. And further, in regard to the best, the Tobacco Expert declared that a great mistake would be made if South African growers endeavoured to sell in Europe both raw and manufactured tobacco. Either they should combine to export leaf only, allowing the larger manufacturers in Europe to manufacture and sell it, or they should combine to manufacture, ship, and sell, in competition against the world, all that they produce for export. Although there were good samples included, the Natal tobacco did not as a whole compare favourably with that from other Colonies, and some lots actually moulded so much that they had to be withdrawn, and were quite unsaleable.

In regard to

PRESERVED AND BOTTLED FRUITS,

the condition and preservation of these were much admired, but it was pointed out that, in some instances, in order to secure variety, fruits not in condition for preservation had been used, especially green fruits unfit to eat even after further cooking. If ever Natal preserved fruits are to take a place in the London market it is not a large variety that is wanted so much as large stock of a few of the varieties less easily obtainable elsewhere, and these put up only in the best possible condition for table use. In Holland, where a heavy duty on bottled fruit exists, it was suggested that the importation of such fruits in large barrels as a raw product, and its subsequent bottling, would not only escape duty but also save export and import of the bulky and breakable bottles. Cape gooseberry pulp, however, shown in bulk in England, found no demand, while the bottles were readily bought. In this, as in regard to every other fruit, bottles were in demand, while tins, even of the same variety and maker's brand, were not.

Enquiries were more frequent in regard to monkey-nuts than in regard to perhaps any other product, their use for the expression of oil having apparently assumed large proportions, still the enquiry was constantly for the large nuts shown by Rhodesia in preference to the smaller nut from Natal. The large nut was new to me, and nearly twice the size of ordinary Natal monkey-nuts, but wherever they may come from the supply of these in the market is evidently large, as they were common in shop windows, especially in Holland.

Beans had only their milling value, except in the case of the few varieties for which a small seed-trade demand existed.

Castor-oil beans were in some demand, and there was a marked preference for the large beans shown by Mr. Wm. Cato from Hillary's, but, of course, in this Natal can only show samples as yet.

Natal butter was admired by the trade, and a demand for it by the ton at about 9d. per lb. was said to exist, the retail price of a similar quality being at the time about 1s. 1d. to 1s. 3d.

The Native curios, strangely enough, were not in demand at the exhibitors' values, and with these, as also in regard to horns, skins, etc., wholesale men showed one that they were able to buy in bulk from country traders in South Africa at exceedingly low prices, the trader evidently making his profit off the native truck rather than off the Home deal..

Fibres will be dealt with in a separate report, so are omitted here.

Natal grain was admired, but, with the exception of mealies, it was not fully understood, and experts declared themselves unable to say anything except as bird or fowl feed in regard to kafir-corn, millets, buckwheat, sunflower seed, etc., though for the sunflower seeds the oil-expressers were prepared to quote if thousands of tons were available.

This demand for

LARGE CONSIGNMENTS

appeared to be a feature in everything; experimental lots were not in the line of the wholesale men, and they must either buy enough to make a thing a leading line or keep off it altogether. Hence exists the greatest difficulty in getting an innings in regard to anything. The whole machinery of commerce in London appears to be like a very large fly-wheel, requiring an immense pressure to get it into motion in regard to any one article, but once started giving impetus to everything connected with it. And, until Natal has volume in leading lines, sufficient to attract attention and ensure permanent and regular supply, no endeavour need be expected from the London end to attract Natal's small surplus quantities; these can only be dumped in London like other surplus lots, and realise as much below London price as the absence of a known name and the absence of due advertisement are likely to fetch. But it is not the man who feels discouraged by this and at once withdraws who is ever going to succeed. If his article has intrinsic value in it, and is methodically placed there every season in some quantity and under the same brand, even at a loss, it will sooner or later attract attention as a constant factor, and secure its place at its *actual value* there. Efficient advertisement is enormously dear in London; business without advertisement is equally expensive and even less satisfactory; consequently volume and quality are both necessary in anything which is to succeed.

PINEAPPLES.

I have as yet only barely mentioned the fruit sent to the Exhibition, but may be allowed to say more on that than on other subjects which do not come so much within my own province. Natal pineapples were made a feature of the Exhibition, and, so far as Natal is concerned, are not unlikely to leave the greatest permanent improvement in oversea export occasioned by the Exhibition, at least in so far as immediate effect is concerned. But even in that line the exhibits were not up to my expectation. When I met the Natal Fruit Growers' Association at Durban with a view to getting up exhibits I laid down as a standard that Queen pines sent forward should not be less than 3 lbs. in weight, and Smooth Cayennes considerably more. Later it was found that if this were adhered to there would be only a few dozen Queens forthcoming. But it was desired to show in quantity, and on purpose to allow this smaller sizes were accepted, growers being expected to send the best they could, while an arrangement was made with one syndicate that they would send forward 50 tons measurement of pineapples, for exhibition and sale by their own representative, the size to be, if possible, 2 lbs. weight or over, while, on purpose to popularise the fruit in London they were limited to a selling price not exceeding 4d. per lb. It was then exceedingly disappointing to find that though 70 or 75 tons' measurement altogether were sent forward very few Queens were over 2 lbs. in weight (and these mostly from the Government Experiment Orchard, Winkel Spruit), while many were nearer one pound in weight, and even among these all stages of ripeness came forward, including quite green pines per cold chamber, in spite of my advice to send only one degree of ripeness in one case, and only full-ripe pines per cold chamber, and well-coloured pines as deck crago. Cases also contained large and small mixed indiscriminately, and even some which had been evidently damaged before being packed. So long as this indiscriminate mixture of various size, quality, ripeness, and condition is allowed to be shipped, all shippers may expect the value of even good consignments to be regulated by the worst. Some senders' lots were uniformly poor and unsaleable, and the only large lot which could be described as uniformly of good quality and well packed was that from Winkel Spruit. These were packed about 9 or 10 in a case 12 inches by 24 inches by 6 inches, and were each wrapped in tissue paper, and packed lightly with medium wood-wool, some cases being sent in cold chamber and some on deck for comparison. The first consignment went per "Durham Castle," by which I also travelled, and I had opportunity of watching the deck consignment on the way. They were placed on the navigation deck, in the best possible place on the ship for cool open-air treatment, and protected from bright sunshine, so I do not think that under any circumstances pines could have better treatment as deck cargo, while if in large quantity the treatment could not be so good. These, when opened, were found uniform in having the pine itself in quite good but very fully ripe condition, while the crown had lost its appearance through every leaf being more or less withered and flaccid, the lower leaves being more and more so and the neck of the crown soft and rather flabby. As table ornaments their beauty was gone, and since it is quite as much for centre-ornament as for eating that pineapples are usually purchased their value for that purpose was also gone. For eating purposes they were quite fit during the first two days, but thereafter rapidly blackened in the centre and also in some of the pips.

The consignment sent per cool chamber in the same steamer arrived in excellent condition throughout, the fruits being crisp, plump and fresh, the crowns erect, firm, and undamaged, and the whole appearance attractive and quite fit for table decoration and for table use. Subsequent consignments from Winkel Spruit all bore out this experience, and consignments from other sources confirmed the same in so far as they lent themselves to comparison. In every case deck fruits were easily recognisable, and when exposed for public sale by auction in Covent Garden they brought about 3s. per dozen, as against about 6s. per dozen for those from cold chamber, only with this difference, that the latter appeared to be always saleable if sold on arrival and in good condition, while the former were a doubtful sale at any time. The only other pineapples meantime in the market are from the Azores, and are of a much larger pine, 4—6 lbs. in weight, of very high-shouldered form, reddish-brown colour, firm consistency, fair flavour, quite flat scales, and small crown, and altogether a pine of better appearance than any we have in Natal.* They are supplied in fair abundance, in crates of 6 to 10, those in a case being uniform as to size, ripeness, colour, crown, etc., and every pine is ready for eating as passed through the sale-room. No defect of any kind was observed on any Azores pineapple offered in Covent Garden, and every case was fully open, and fit for close inspection before being passed through the ring. The price of these ranged from 2s. to 4s. per pine, and in the retail shops the price for the same fruits ranged from 3s. to 6s. each. These prices confine the use of pineapples to the wealthy, and limit the demand very considerably. It was hoped that the Natal pineapple, at a price which allowed even the working man to purchase, would be in large demand. No doubt so it will in time, but it must be remembered that this was supplying a new article to a class of customer who had not previously tasted it, and who has, all the year round, an abundant supply of well known fruits at reasonable rates. The taste for pinapples is more or less an acquired one, and it has still to be acquired by the middle and working classes of England. To assist in this the supply of pineapples belonging to Government were distributed judiciously and without charge whenever it seemed likely that sampling advertisement would be effected, and only in a few cases were these offered for sale in Covent Garden, and that rather to test the market and the methods of handling than with a view to realisation, except in regard to unsatisfactory deck cargo. It was surprising how many channels could be produced through which the increase in popularity of Natal pineapples by gratuitous distribution was recommended, and if the London public have not now acquired a taste in that direction it is not for want of opportunity.

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* Plants of this pineapple were imported last year and are now being propagated at Winkel Spruit.

The pineapples sent forward by private exhibitors were generally unsatisfactory, and the special methods of packing were all found defective, and the grading very bad. This is a matter requiring Government supervision if the trade is not to be ruined by the less scrupulous. The Smooth Cayennes were better, but, unfortunately, the best lots were all packed in mealie husks, which either had not been dry enough or had absorbed moisture from the pines or from the cold chamber. In any case the result was that the pineapples were mildewed past redemption. In a few instances in which they were not mildewed they did not compare favourably either in colour, shoulder, flatness of scale, or general appearance, with the Azores pines of similar size. They are consequently less suitable for table decoration in the houses of the wealthy, and still too expensive for the poorer. For the present the best market for these is in South Africa, and, taking the whole pineapple question broadly, my recommendation is to continue sending in quantity *the best only* of the Queen pines, to send these per cool chamber, to adopt the Government method of packing and size of box, and to use the Cayennes and small Queens rather in South Africa than in England, but meantime to work up a stock of the Azores pine for London market, and in regard to all kinds to adopt methods of culture and manuring which will ensure larger and finer pines than those meantime produced. Along with all this must be the abandonment of expectation of *extraordinary* prices; it is a large, steady, honest trade in finest fruit at natural market value that is going to pay. At present rates of cold chamber freight, 2 ℔. pines cost 3s. per dozen for freight and allied charges, and it is a reduction on this rather than lowering the cost of deck freight that is to do any good. I should say, place no confidence at all in deck transport, for though under this treatment the fruits arrive fit for pulping, preserving, or making essences or syrups, they arrive only in lowest marketable condition for market purposes, and must detract from the sale value of every better consignment. Many, indeed, sent as deck cargo, arrived only in condition for the refuse heap, and this was the general condition of the pineapples sent from Albany, Cape Colony, which were altogether an inferior lot, badly handled, and unfit for exhibition.

Those sent forward by the Natal Fruit Export Association were mostly in cases 36 inches by 14 inches by 12 inches, containing about two dozen, packed in an upright position, and with inch stalks sealed with sealing wax at the end. The long stalks and the sealing wax were valuable features; generally, the fruits were in good order if sent per cold chamber, and only fair or worse if sent on deck, but the worst feature was that the cases had no marks by which the top could be identified, and in many instances they had travelled upside-down, with the result that what would otherwise have been fine crowns were utterly ruined. The representative of this Association has promised a separate report on his experiences, which will be awaited with interest.

In regard to other kinds of fruit, it has already been mentioned that the main supply from Natal was sent in time to be on exhibition February 13th, and that the actual opening only took place February 23rd. This was disastrous. The fruit was taken out of the ship's cold chamber about February 6th, and, as no cold chamber was available at the Exhibition Hall until after the opening, it had to be kept as well as the accommodation in the Hall and cellars would allow. It would have been better to have marketed all on arrival, but as no large succession consignments had been promised it was decided to keep all, if possible, until the opening date, or later. Condition varied much, even on arrival, and a few days' storage and exposure did not improve matters. By the opening date, little of it was in good exhibition form, while practically all had gone past the marketable stage, and as it was then unfit to distribute as samples of Natal fruit what was unfit for the Exhibition tables was sent to the hospitals, or destroyed.

It may be remarked, however, that the condition on arrival was as follows:—

MANGOES.

Mangoes which had been shipped ripe per cool chamber were in excellent condition inside, but had a spotted or blackened surface which rendered them totally unsaleable. Kinds differed in this, however, the red kidney mango being still fit for table use, while the green kinds were much less so. And mangoes which had not been ripe when packed arrived in better condition externally but hard and still not eatable. Ripened gradually in the Hall a few of these were in good condition alike as to appearance, flavour, and consistence, on February 23rd and for a week afterwards; while a much larger proportion went wrong inside without ever ripening, but had good exterior appearance. If ever a trade in mangoes is developed, it appears to me that it will have to be through sending fruits nearly but not quite ripe, and ripening them in artificially heated rooms after arrival, but this is a requirement for which the fruit trade is at present unprepared, and would require united organisation by senders to ripen their own fruit on arrival. They must also be prepared, at least till much experience is gained, to save only a small proportion of the fruit sent. It has also to be kept in mind that the demand is limited to the comparatively small number of Anglo-Indians resident in London, and these not of the *very wealthy* class, but still accustomed in India to the finest varieties of mango grown there, with which our Natal kinds do not compare favourably. The continued importation and propagation of best kinds, and continued experiments in shipping what we have, are necessary.

PAWPAWS.

Pawpaws arrived in splendid eating condition, and were much enjoyed by all who tasted them, most of whom had never tasted them before, but the skin was in every case damaged by mouldy blotches, and the appearance rendered them quite unsaleable. I do not despair of being able still to bring about an immense export trade in pawpaws, and think it likely that further packing experiments, and possibly the use of formalin as a coating, may do much towards ensuring their arrival in good condition and with sound skin.

BANANAS.

A few bananas were sent forward, packed mostly in hands. In every case the skin was quite black and unsaleable, while the fruit inside was in nice condition for eating. In view of the abundant supply of bananas which arrives in splendid order and exceedingly low prices from the Canaries and elsewhere, and hung unpacked in the fruit steamers from the West Indies, I do not think that the export of bananas from South Africa to Europe can ever pay, or should ever be attempted. The beautiful condition in which these West Indian bananas arrive and are distributed should, however, give us hints as to their transport from one part of Africa to another. The blackened and damaged bananas which are so common even in Durban and Maritzburg, and which are the usual condition in Johannesburg, East London, Port Elizabeth, and Capetown, are no credit to our transport arrangements, and can surely be improved on.

Avocado pears arrived fairly fit, though more or less spotted, and are almost unknown in London, and not likely to take on largely at once even if sent in good order.

GRENADILLAS.

Grenadillas arrived mostly shrivelled, and in no case attractive. Worse than this, it was found on opening that the juice had mostly disappeared, and that the contents of each were less than a tea-spoonful, mostly of seeds. Grenadillas may be much enjoyed by those who know them, but there is nothing attractive in a withered up greenish fruit, containing practically no juice and only a small quantity of pulp and seed of unfamiliar and rather unpleasant flavour. A better grenadilla, under the name passion fruit, arrives in small quantity from the Canaries and the Mediterranean; it is considerably larger than ours, has a bright yellow colour, arrives plump and firm, and with a full supply of pulp, similar in flavour to ours. There is a limited demand for that fruit among those who know it, and I have arranged for seed to be sent here for growth in Natal for local use. But whenever a large supply arrives in London the first few cases sell, and the balance are quite unsaleable.

After the Exhibition closed a considerable consignment of Natal grenadillas arrived from Nel's Rust, which brought no bid either in the private sales or public auction of Covent Garden. On the same day a tinned consignment from Australia of a larger grenadilla, plump and firm, was equally unsuccessful in regard to sale, and I predict that grenadillas as fruit will not form a Natal export. It is possible, however, that the contents of the fruit, barrelled in bulk, may eventually be in demand for bottling out.

The few Natal oranges and lemons present at the Exhibition arrived in fair condition and helped to eke out the otherwise small show of Natal fruit.

In regard to

HARDY FRUITS,

it is a pity that exhibitors could not have been present in a body to compare their own with that from Cape Colony. I suggest, as a next best method, that a full exhibition of Cape fruits should be held in Maritzburg next season, and that all Natal fruit-growers should be encouraged to attend. In this at least the Cape is miles ahead of Natal. The kinds, the grading, the selection, the cases, the packing, the marking, and every other particular, is the result of many years of experience all directed toward the London market, and Natal, if so inclined, can benefit immensely by all this experience, without repeating all the experiments. The Cape Fruit Export Association now requires inspection, at the wharf, of all fruit exported under its aegis, and the only weak spot in this appears to me to be that it is not a compulsory Government inspection, and consequently that growers can ship any trash outside the Association, and thereby give the Cape a name abroad for a lower grade than its best. But the material which arrived at the Exhibition and also at Covent Garden, many thousand cases at a time, was simply grand, and many English growers informed me that even during the best English season it was difficult to bring together such a fine exhibition of Home-grown plums, peaches, apricots, and pears. Apples were much less satisfactory, usually showing a certain amount of spot (Bitter-pit). In regard to this trouble, which is not unknown in England, Mr. H. T. Gusson, who has been investigating the subject closely, has arrived at the conclusion that it is not due to fungoid trouble, but that it is caused by want of nutrition while the fruit is quite young, causing the breakdown of certain cells or groups of cells, which thereafter remain undeveloped and cause local trouble. He attributes it usually, if not always, to want of water soon after the fruit is set, and holds that the cure is a cultural one instead of one by chemical sprays as has been previously held.

In regard to Natal hardy fruit, Satsuma plums were undoubtedly the best. These arrived from various growers and under various methods of packing in fairly satisfactory condition. But the size was not up to the Cape standard, nor does the colour of the flesh commend itself for table use. Kelsey and other plums of that nature mostly arrived slightly over-ripe, and much below the Cape size-standard. The peaches forwarded would generally have been no credit to Maritzburg market, miserable, spotted, uncoloured and flavourless clingstones and even St. Helena's being the rule. These were unsaleable at any price, unfit for exhibition, and unfit for giving even to the labourers. One lot of three cases were better than the rest, but even these, though pretty and attractive externally in appearance, were much under the Cape size-standard, and were found to be almost all wrong and subject to a dry brown decay internally. Pears also were unsatisfactory, except one lot which arrived after the Exhibition was in Holland, and which, though evidently fine fruits that had been in good form a few days previously, were then just too far gone to be saleable, though still fit for showing. Apples were poor throughout.

It is no wonder then that the judges, who did not see the main consignment of Natal fruit until little of it was left, found only pineapples that they could commend, while the public opinion of Natal fruit, apart from pines, was that it was poor. Those who know Natal, know that the display, after the Exhibition opened, was not representative of what Natal can do in the way of fresh fruit, and almost every Natalian present remarked that he grew better fruit at home in the Colony. But, the pity is, he neglected to send it forward. Now, those who sent forward consignments deserve every commendation for having done so, if they sent to the best of their ability. Still, if they did so, it only shows how very much has yet to be learned in Natal in regard to fruit culture and marketing. The work of those at the Government Cold Stores who censored and heavily thinned the consignment of hardy fruit must have been hard indeed, for on several occasions I was advised that they doubted the wisdom of sending forward *any* of the fruit sent in, and my impression when the best came forward and was shown in the same hall as the Cape fruit was that they would have done well to have condemned all. Had it been of any use I would rather have marketed all than retained it, but if there was one thing more evident than another it was that second-rate fruit was absolutely unsaleable either in Covent

Garden or anywhere else in London. Not a single case of second-rate fruit did I see in London except our own, and when on one occasion I got a coster-monger in to see if he would give *anything* for a lot he forcibly decline to take it away if given free. Among the hundreds of thousands of cases passing through Covent Garden—more every day than Natal produces in a year—absolutely none were offered in anything but the finest condition, and it was evident that where the transport could not be relied on to allow cases to open out as packed, re-packing on arrival was practised, removing all except the best. I trust, in dealing with the citrus fruits now going forward to London, this has been considered, for the fruit and the freight and the attendant charges are all alike wasted if this has not been done. In regard to

CITRUS FRUIT,

the finest oranges were being retailed at two to three a penny during February and March, but I was assured that in May and June good prices could be obtained if the material were good enough.

Large size, good colour, and absolute freedom from scale were the qualities sought after, external appearance being more considered than flavour, though that as well as thinness of skin and absence of rag and seed are also factors. The market salesmen, who are accustomed to receiving oranges from all quarters packed in 2-compartment and 3-compartment boxes about 2 to 3 feet long, 15 inches wide and 12 inches deep, with curved lids, could see no reason for packing oranges in single-layer cases, and considered that the price of oranges was not likely, under any conditions, to warrant that. In regard to mandarins, they held that these should be packed in single-layer boxes, neatly done up like plums or raisins, and each fruit separately packed in named paper, or some in tin-foil for effect, and, of course, the same applies to naartjes. I mention these as their opinions, not as my own, but I quite recognise that established custom is more difficult to move in London than in the Colonies.

I have doubts also as to the suitability of deck transport for citrus fruits crossing the Equator, but this point will possibly be made clear by present consignments.

In regard to price, oranges are abundant and first-rate meantime for nine months out of the year, and it is only by coming in during the other three months that ours have a chance. But at that season other fresh local fruits are abundant and good as well as cheap, and it seems to me doubtful if prices much higher than ordinary citrus prices will be obtainable, the change to other varieties being more appreciated than the continuance of the staple. Senders must not be disappointed then if, for this year at least, prices do not come up to expectation, especially if senders are allowed to select for themselves, without other inspection, what they may send. Fancy prices are not to be looked for, but if a market for increasing quantity, at Natal market rate, is to be found everyone should be satisfied.

In regard to the marketing of Natal fruit in London or elsewhere in England or Europe, it may be well for Natal growers to understand the arrangements for disposal as they now exist.

COVENT GARDEN.

Covent Garden market is the great distributing centre through which all foreign and much local fruit for consumption in London is passed, and much for the provinces also passes through the same channel. It consists of two separate markets, the one wholesale and by auction, the other both wholesale and retail, but usually without auction sale. The auction sale-room deals with most of the foreign fruit arriving in London, whether it afterwards finds its way into the other Covent Garden market or not, and much of this also finds its way into other wholesale and retail markets, such as the Spitalfields market in the East End, the Borough market on the Surrey side, or the Brentford market in the West. The Covent Garden auction-room includes about a dozen auctioneers' rostrums, at each of which, every morning, four or five auctioneers of their assistants are fully engaged, all this crowd of auctioneers yelling simultaneously as loud and fast as they can howl, and picking up bids from the most densely packed and strangely mixed crowd imaginable. This is the nearest approach to a complete Babel it is possible to produce, every language on earth being in use, besides much language which belongs to no language. But all is good-natured and orderly. Case after case passes up, appears for a minute, all four auctioneers on the rostrum yell at once, each searches his own share of the crowd for bids and adds them to those already bidden to either of the other auctioneers, down goes the hammer suddenly as soon as a bid is not forthcoming, and the case passed out of sight to make room for the next. Or, it may be, one is up as a sample of a dozen, or hundred, or thousand. But even then, and in any circumstances, every case has been open for inspection before passing up, and intending purchasers see to it that they know before-hand what cases they mean to purchase, and what price they intend to give, and none rely on inspection at the minute it is under the hammer, further than to identify the case by number and make sure it is what he is bidding for. But there are always those present in large numbers who select nothing, but who are ready, when any package comes up which bids show to have been selected by nobody, to buy it on its face value, judged at one glance, if they see that it is a bargain, and these buyers know that no auctioneer can afford to allow any package to pass through his hands which is not equal throughout to its surface appearance. Under this class of sale it is almost impossible for other than straight work to be conducted without an auctioneer soon being known and boycotted alike by sellers and buyers.

But, in addition to the auction sale, there are many wholesale Covent Garden fruit dealers who import or receive from abroad, and each supplies his own clients throughout the metropolis or throughout the country, doing all fruit buying for them, and purchasing at auction or elsewhere whatever these customers may require if they themselves do not hold in stock at the minute. Some of these have several branch businesses conducted separately, as, for instance, one branch conducting auction sales, another carrying on wholesale fruit trade, another retail fruit trade, another vegetable trade, another flowering plants and cut flowers, while yet another deals with horticultural sundries, such as baskets, punnets, labels, fruit-cases, wrapping papers, etc. Such a firm naturally can place within itself the requirements of almost any buyer or seller in the horticultural or fruit line.

There are also fruit factors, mostly wholesale merchants conducting other lines as well, who receive and handle consignments in bulk, but who have no market stand and often no display store, their method being to keep in touch with all markets throughout the country, know as far as possible stocks in hand everywhere, stocks coming on, and present and near future prices at each centre, and then on advice of a consignment coming on to them to place same either in whole or distributed wherever the best price is likely to be obtained. This is a business requiring a vast experience, and in such perishable business as the fruit trade requiring also a knowledge of the financial position of every customer throughout the country.

I have described the sale arrangements with such detail because Natal, like the Cape, has a tendency to expect a special agent in England to work miracles for them. I consider such a scheme ill-advised and likely to be disastrous, except under the strongest limitations as to duty. If such an agent, be his title Trade Commissioner or anything else, is, in regard to fruit, to take the place of the fruit factor above described, and is at the same time a man who has spent many of his recent years in South Africa, it is like placing an amateur in competition with the smartest Jews this world contains, and who have for their whole lives and sometimes for generations been accumulating experience in this line. Natural chances are all against success, while the chances of getting good sales to all the bad customers, leading eventually to tremendous losses are almost certain. There may be use for a Trade Commissioner, and there may be use for the Permanent South African Trade Office proposed at first in connection with the South African Products Exhibition, but it is certainly not in the direction above indicated, and I recommend that Natal take no part in maintaining it.

But as to what is to be done in regard to the selling of Natal fruit in England, that question is already before us; and, while many firms are willing to take up sole agency, and may be relied upon to act straight in that capacity, I cannot recommend the selection of one of these either. As already mentioned, each has his own *clientele*, and the placing of all in one firm's hands only results in that firm's clients having the parcels divided among them, without outside competition. This is manifestly not the best method. But we already have the Agent-General, acting in all matters in the best interests of the Colony, and exceedingly careful that best results are always obtained, who is quite in touch with the Covent Garden salesmen, and especially with the auctioneers, and who can place any consignment with one or more of these as the extent and value of the consignment, and the previous returns from each auctioneer may warrant, receiving within a day or two market notes and cheque from each for the value realised, and able to place future consignments in accordance with these. This appears to me to be the simple solution of the question so far as Natal is concerned, and it will cost nothing additional to present expenditure, except possibly an additional junior clerk in the Agent-General's office as soon as the trade is found to warrant that. This does away with the probability of bad debts, and it ensures the *actual value* in London being regularly realised. The only question is whether inspection on arrival, repacking when necessary, and ripening up to sale condition in warm chambers should not be also taken in hand.

But in regard to the packing and forwarding of consignments much change is necessary. The Natal Fruit Export Association has done good work this year in organising the despatch of fruit in quantity from many sources. But it is somewhat doubtful policy for fruit-growers to allow a private company to monopolise the trade in this way. They have already allowed coolie traders to monopolise retail and local transport, and if they allow a strong company now to take up over-sea export for them they may live to rue it.

Of course, it can be pointed out that it was in this manner that the now vast fruit trade of the West Indies originated, but business instinct indicates that there is a danger in it. A co-operative union of growers, necessarily open at all times to all, and with stringent export regulations, preferably given force by law and protected by Government inspection, appears to me the most satisfactory solution What has been done in Natal in this direction during my absence in England is unknown to me, but unless this is already arranged I consider it should be taken up at once. The weak point in the Natal Fruit Export Association's work was in allowing each grower to pack his own, without inspection until arrival in England, and without satisfactory means of identification even then. Some growers' consignments were absolutely disgraceful, others were highly meritorious throughout, and in some instances where such came on together and were delivered mixed, there was no difficulty in separating into original consignments by the quality or want of quality of the contents. Some of these senders, if acting under the laws of some fruit-exporting Colonies, would have been fined heavily. Inspection on the ground, while packing is in progress, and the adoption of a Government stamp, is highly to be commended, if found possible. The lectures delivered every evening were well attended, and often crowded or overflowing, and the lantern slides illustrative of Natal and its industries, prepared by Mr. Allerston and by Mr. Watkinson (railway photographer), were highly appreciated, and added much to the interest of the Exhibition.

An important and vexatious point in connection with the Exhibition was that of import duty. Natal had to pay about £250 of duty on its articles sent to the Exhibition, the rate being the same as if the goods had come from any foreign country. Hall all the articles sent forward by the five Colonies been given away gratis for the purpose of allowing the British public to test Colonial wares, these five Colonies would have had to pay about £1,000 for the privilege of giving these goods away. Of course, where goods are being sold, there may be reason to impose the same duty as other importers have to pay; but for gratis distribution, and for loss through pilfering or other means the case is different, and in any case the Colonies have some claim to preferential treatment as against foreign countries. In some articles where the actual value was low it was found advisable to give the goods away gratis in Holland, where the duties were low, in preference to risking sale in England at possibly less than the cost of duty. This question, and the necessary delay in obtaining refunds of British duty on material sold or given away in Holland or shipped back to Natal, has prevented the final closing of accounts so far, but in so far as practicable values realised have been placed, and early distribution will take place. Where duties are concerned this distribution must necessarily be delayed until refunds are adjusted.

The Exhibition, as a whole, has opened the eyes of the British public very much as to Natal's position and possibilities in the commercial economy of South Africa, for though most parts of South Africa were advertised by the Boer war, few of those who passed through that campaign had any idea that such a fertile country, and of such varied product, existed so close to the high-veld, with which alone they were familiar. Investment in the wattle industry is one sure outcome of the Exhibition; investment in many other lines is more or less assured; development of the natural resources of the Colony by chemical and industrial means has been the subject of many interviews and of several interesting reports; fair report and healthy criticism on many of Natal's products may be expected in the Reports of the Judges and Experts; an export industry in Natal pineapples has been given a most liberal start; immigration of agricultural settlers possessed of sufficient means to allow them to develop their holdings has been encouraged; and altogether Natal may consider that the £1,000 voted by Parliament in respect of the Exhibition has been well-warranted expenditure, and likely to give very good results. But too much must not be expected immediately; it will take years to show all the results of this Exhibition; and probably many results at present undreamed of will show themselves in due time.

Further advertisement of the same kind after four or five years would undoubtedly do good, but I doubt the wisdom of any earlier attempt, and even then would recommend Natal to act alone rather than in concert with other Colonies. The present Exhibition has, however, been, as promised by Sir Peter Bam, thoroughly South African, and not representative of his Colony only.

T. R. SIM, F.L.S.,
Natal Representative to the S.A.P. Exhibition.

London, April 27th, 1907.

NOTE.—I find since my return that the Natal Fruit Export Company bought on the ground, and packed by its own agents, so the remarks regarding this association refer to its agents, not to the growers. In the case of all other growers the fruit was sent to the Government Cold Stores for Government to handle either in accordance with senders' instructions or as it required.

A correspondent of the *International Sugar Journal* states that a large meeting of the sugar planters of Mauritius was held on the 7th May last to petition the Governor to assist them in raising a loan of not less than £600,000, to be applied to the enlargement of their factories and the improvement of their machinery and estates. It is assumed that the amount would be raised in England, through the Colonial Office, at about 4 per cent.

The *Queensland Agricultural Journal* suggests the following "cure" for egg-eating dogs:—To cure a dog of eating eggs, draw the contents of two or three eggs by making holes in both ends, and fill in with a paste of some kind containing a little red pepper. Put these in the nests where the pup is accustomed to find eggs. Do not practise cruelty on the young brute by using a large quantity of pepper—a little will suffice to give him a poor opinion of eggs as a diet for dogs. Another good plan is to draw the contents of the egg, put some strong liquid ammonia into it, and close hermetically. The dog who cracks this egg will never crack another. The dose, moreover, will do him no harm.

Geological Notes on the Coal and Gold Deposits in Natal.

A PAPER READ BEFORE THE SOUTH AFRICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

By C. J. Gray, Commissioner of Mines, Natal.

The small patches of Prussian on the map exhibited* show the places at which coal seams have been opened. It will be seen that coal occurs in almost every part of the Colony. The seams are of two ages.

Mr. Anderson, lately Government Geologist of Natal, has pointed out** that the coal in the Drakensberg, in the Polela Division, being accompanied by a Thinnfeldia fossil flora, is of Stormberg age, and more recent than the other coals, which are with a Glossopteris flora. This Stormberg seam is about 5,750 feet above sea level. The actual coal, which is little more than 2 feet thick at the best exposures, is very bituminous near the headwaters of the Umkomaas, and there grades into bituminous shales, but it becomes more anthracitic and unaccompanied by shales to the southward. It is high in ash. The ratio of fixed carbon to volatile hydrocarbons at the Umkomaas is 1·2 to 1, and at Garden Castle 3·4 to 1.

Mr. Anderson classes the lower and far more important coal seams in the Ecca series, including in that term: the glacial Dwyka conglomerate; the dark coloured non-fossiliferous Pietermaritzburg shales lying immediately above the Dwyka; the light coloured shales and sandstones forming the upper portion of the Pietermaritzburg shales; and the still higher sandstones and shales containing abundant glossopteris and some reptilian remains in which the coal seams occur. The series is separated from the Stormberg beds by the Beaufort claystones, fine-grained sandstones and shales, containing more abundant reptilian remains.

It has been my practice to divide the series into three divisions, viz., the Dwyka, the Ecca shales, and the Natal Coal Measures; and I consider that those divisions should be recognised in all geological mapping and other geological work in the Colony. The divisions are distinct in petrological character, and for that reason can be readily distinguished in the field. The coal measure shales generally show remains of fossil flora, while the Ecca shales do not show such remains,

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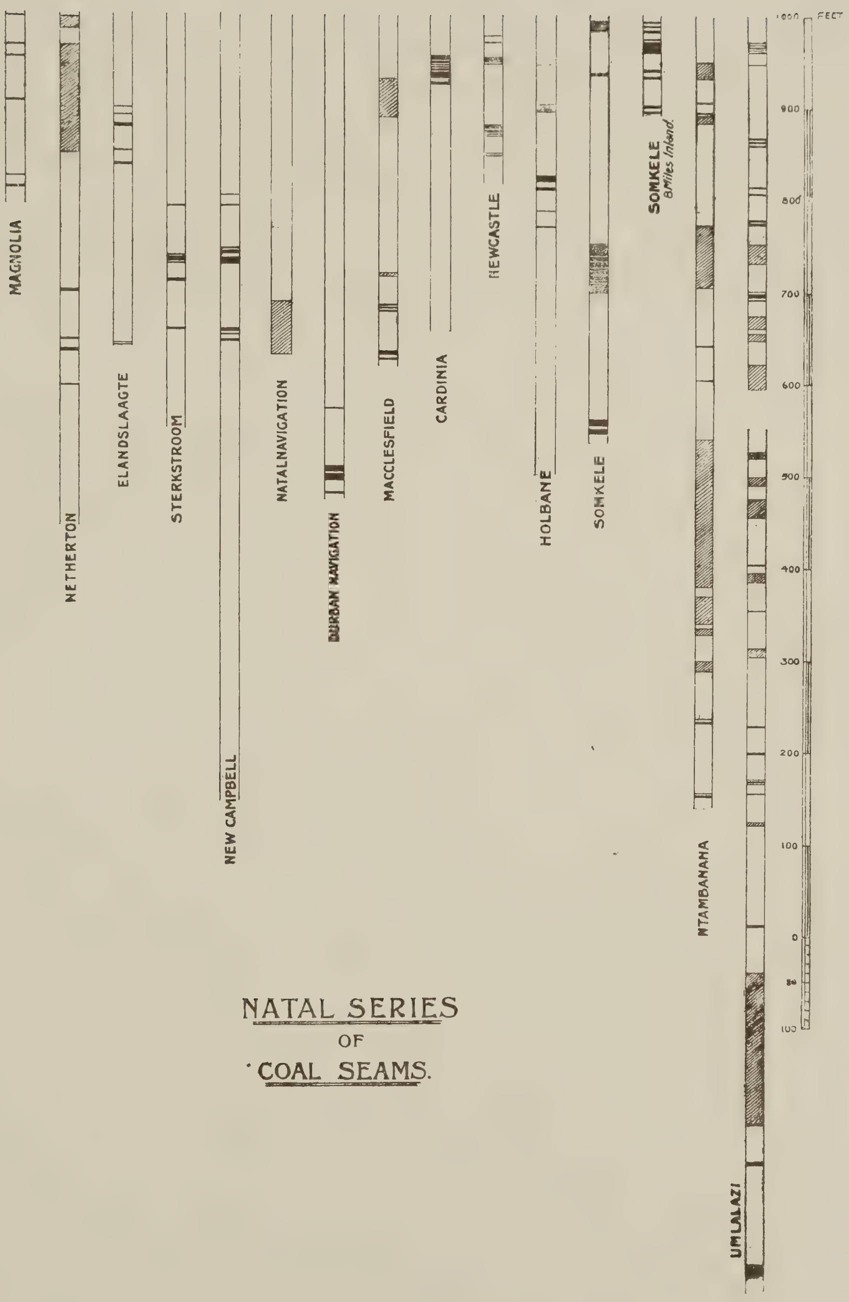
* Not Reproduced.

** 2nd Report, Geological Survey of Natal.


MAGNOLIA
NETHERTON
ELANDSLAAGTE
STERKSTROOM
NEW CAMPBELL
NATALNAVIGATION
DURBAN NAVIGATION
MACCLESFIELD
CARDINIA
NEWCASTLE
HOLBANE
SOMKELE
SOMKELE
8 Miles Inland
NTAMBANANA
UMLALAZI
1000
FEET
900
800
700
600
500
400
300
200
100
0
50
100

NATAL SERIES
OF
COAL SEAMS.

The lower of the two Umlalazi boreholes (shown on the extreme right) was misplaced when the original diagram was redrawn for the purposes of reproduction. The space between the two upper and lower boreholes should be approximately 150 feet instead of about 50 feet as at present shown. Allowance should accordingly be made when studying the levels of the strata.

The black portions of the boreholes represent coal seams; the shaded portions whinstone.

though in places they contain thin and valueless anthracite seams and graphitic beds. Even in hand samples the distinction can generally be made with some approach to certainty, as the coal measure shales are as a rule less dense in texture, and either more sandy or micaceous than the older shales. From the economic point of view, their recognition is of great importance, as the economic products, either minerals or building stones, of the different divisions, their characters affecting water supply, the soils resulting from their weathering, and their influence on topography, all differ greatly.

I do urge that the terms which I use to indicate the divisions are the best, or undoubtedly correct. The apparent absence of fossils in what I call the Ecca shales may indicate that the division is older than the Ecca shales of the Cape Colony, and would be more correctly termed the Dwyka shales. The shales, though nearly 1,000 feet thick at Maritzburg, thin out inland so that they are only a few feet thick, or, according to Dr. Molengraaf,* entirely absent, in some places near the northern border of the Colony. That thinning in some degree supports the idea that they are Dwyka shales, and is of interest in connection with the close association of coal seams with the Dwyka conglomerate at Vereeniging, in the Orange River Colony. The term Natal Coal Measures, though locally useful, is not quite suitable for a series which is important and contains valuable coal seams far outside the Colony. It may be desirable to say that, though adopting the Ecca correlation, I do not definitely decide on the doubtful question as to whether the Natal coal measures should be placed in the Ecca or the Beaufort series, but I consider that in either case they should be named, studied, and mapped as a separate division.

We now turn to the consideration of the distribution of coal in the Natal Coal Measures. Speaking generally, and without regard to local washouts and igneous intrusions, it may be said that, except to the west of the railway line from Harrismith to Durban, and in Durban and Victoria Counties, we find coal, in seams over a foot thick, wherever the proper horizon in the coal measures is pierced, but elsewhere the measures do not show any important seams. The diagram gives a number of typical sections of the series of seams, which I should say are selected as being the most complete readily obtainable, and not because of the thickness of the seams.

On the farm "Magnolia,"** on the high ground between Greytown and Reit Vlei, the outcrops of six thin seams are exposed, the thickest seam at the place containing 1 foot $5\frac{1}{2}$ inches of coal. It is about 4,030 feet above sea level. On the farm "Pampoen Nek," in the same neighbourhood, where the principal coal seam is thicker, a borehole** 159 feet deep has been put down beneath the seam, proving alternating beds of sandstone and shale belonging to the coal measures, to a depth of 400 feet, where the Ecca shales were apparently reached.

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* Geological Survey Report, S.A.R., 1898.

** *Vide* Mines Department Report, Natal, 1898.

To the north-west of the Greytown Coalfields, in the neighbourhood of Mooi River, Willow Grange, Estcourt, and Frere, numerous thin seams outcrop, but none have yet been proved to be of value, though much drilling has been done in search of payable seams. As examples of the boreholes, I may mention one on the farm "Greenfield,"* near Mooi River Station, about 4,550 feet above sea level and 1,095 feet deep; one on the farm "Glendoone," ** near the Bushman's River, about 3,950 feet above sea level and 1,345 feet deep; one on the farm "Welgenspruit,"*** near Estcourt, about 3,850 feet above sea level, 880 feet deep; and one near Frere*** Station above 3,450 feet above sea level, 727 feet deep.

Probably each of the boreholes mentioned, with the exception of that at Mooi River, is entirely in the coal measures. The published section of the Mooi River borehole is unreliable, owing to a misleading use being made of the term "Boulder clay." From examination of the core, it appears to me probable that the Ecca shales were reached at a depth of about 950 feet, that is, about 900 feet below a thin coal seam pierced by the bore. In the Glendoone boring two half-inch streaks of coal were observed at depths of 243 feet and 613 feet respectively. The Estcourt bore passed through 5 inches of coal at a depth of 567 feet.

Between Colenso and Pepworth Stations, the coal measures are absent, the Ecca shales being exposed owing to a great upthrow of a strip of the strata, the vertical displacement being probably not much less than 1,000 feet. The southern fault probably runs along the Tugela Valley near Colenso, turning off near Spion Kop towards Harrismith, and passing a little to the east of Acton Homes. The northern fault runs from about ¾ mile south of Pepworth Station across the farm "Burford," near the sharp southerly bend of the Klip River. Beyond that fault a strip is met with which has been dropped about 500 feet, the differential movement on the fault being therefore approximately 1,500 feet. On crossing the fault, the coal measure sandstones suddenly appear on the surface, while several boreholes, among which may be mentioned the one on the farm "Netherton," have passed through the coal seams at heights above sea level of about 3,050 feet.

Near Elandslaagte the northern side of the depressed strip is reached; and at the Elandslaagte Colliery coal outcrops, the seams being respectively 3,538 feet and 3,529 feet above sea level. From boreholes put down at Elandslaagte* and the Ramsay Colliery** near Wessel's Nek, it is clear the lower seam must be more than 700 feet above the Ecca shales.

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* *Vide* Mines Department Report, Natal, 1898.

** *Vide* Mines Department Report, Natal, 1902.

*** *Vide* Mines Department Report, Natal, 1890-91.

To the north of the Biggarsberg, the seams are observed to be closing together. Near Glencoe Junction, on the farm "Sterkstroom," the two principal seams are 15 feet apart; at the Woodlands Colliery, between Glencoe and Hatting Spruit, 5 feet; and at the Durban Navigation Colliery, near Dannhauser, 1 foot 6 inches.

North of Dannhauser, the sections of the coal seams and the associated strata become very variable, widely different results being obtained in boreholes relatively close to one another. As a generalisation, it may be said that there we usually find two seams, one thick and the other thin. I give borehole sections from the adjoining farms "Macclesfield" and "Gardenia," and from the Newcastle Colliery. It is clear that both at Hatting Spruit and Newcastle the coal seams are far from the base of the coal measures. At the Woodlands Colliery (formerly New Campbell) a borehole has passed 500 feet below the seams without reaching the Ecca shales, while on the farm "Johnstone," between Newcastle and Utrecht, a borehole at a lower geological horizon than the coal has gone down 600 feet in coal measures, apparently reaching the Ecca shales at about that depth.

In the Utrecht and Vryheid districts the seams vary in section as they do near Newcastle, but as a rule not quite so rapidly. They are more numerous than on the Klip River field. The section showing a borehole on the farm "Hlobane" gives the sequence in that locality. The lowest seam at Hlobane is 4,030 feet above sea level, and about 400 feet above the Ecca shales, and, as the latter are thin there, little more above the Dwyka.

Little is known of the seams near Nongoma up to the present.

The coal seams so far referred to lie almost horizontally, but when we come to Somkeli, on the Zululand coast, we meet with a different condition of things, for there the strata dip at an angle of 20 to 30 degrees to the south-east. It appears probable that the parallel lines of outcrop of thick seams which are found on the Somkeli Coalfield do not represent originally separate seams, but are due to step faulting. About 8 miles inland from Somkeli we have a section showing several seams as given in the diagram, while other seams not yet correlated outcrop there. A borehole at the Zululand Colliery, near Somkeli Station, shows a very thick seam and a thinner seam lower down. In the diagram correction has been made for dip. The outcrop of the thick seam is 300 feet above sea level. If we take the shale exposed to the north of the Somkeli outcrop, and reached by boreholes below the seam, to be the Ecca shales, as is probable, the lowest seam must be approximately 275 feet, measured at right angles to the dip of the strata, from the base of the coal measures.

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* B.-H. 19 B. Natal Mines Department Report, 1897.

** B.-H. 9. Natal Mines Department Report, 1889-90.

At Ntambanana, a seam, in some places as much as 7 feet thick but seen to thin elsewhere, is opened by adits. Its relation to other seams is not clear. No other outcrops are exposed, and boreholes put down in flat country in the direction of the dip, which is slight, have shown thin seams only. Ecca shales and Dwyka outcrop inland, a few miles from Ntambanana on the Melmoth road, but it is difficult to estimate the perpendicular distance between the thick coal seam and the base of the coal measures. It is, however, considerable.

The Umlalazi Coalfield, which is on the southern side of the granite belt forming the Ungoye Range of mountains, is very different from the other coalfields in the Colony. The seams are very numerous. As the ground is much broken and tilted, and the seams variable in section, correlation is difficult. I can make no attempt to place the numerous outcrops on the northern side of what is known as the Ibade stream, but, from two borehole sections on the southern side of the Ibade, I have compiled a section showing numerous seams varying from an inch or two up to 8 feet in thickness. The lowest seam shown is probably, judging from a borehole behind the outcrop which has passed into the shales, about 900 feet from the Ecca shales.

It is unnecessary to refer to the various seams on the north coast of Natal, or to the other small coal areas elsewhere; and we may proceed to consider variations in the composition of the coals. The character of the coal in the Stormberg seam has already been referred to.

For the Ecca seams we may generalise by saying that, apart from local variations, the seams are most bituminous near Newcastle. It will be convenient to trace the changes along lines radiating from there, dealing first with the proportions between fixed carbon and volatile hydrocarbons, and then with the percentages of ash in the coals. My remarks are based almost entirely on analyses published either with the report of the Government Coal Testing Committee, 1904-5, or in the various Mines Department reports, but I have made use of a few unpublished analyses, giving some in the table, while others, not available for publication, have assisted me in checking the accuracy of my generalisations. I have avoided analyses representing coals known to be locally affected by igneous intrusions. The samples on which the analyses are based were so taken that they represent the commercial product of the seams and not specially picked coal.

Going south from Newcastle we find ratios of fixed carbon to volatile hydrocarbons as follows:—

Newcastle Colliery, 1·9 to 1; No. 42 Colliery, 2·2; Durban Navigation Colliery, 1·9; Natal Navigation Colliery, 3·4; Glencoe Colliery, 3·5; Natal Merthyr Colliery, 3·3; Central Colliery, 4·2; Elandslaagte Colliery, 2·5;

Elandslaagte bottom seam not worked, 2·7; borehole on Swaartzkloof, 2·3; and then passing to the Greytown Coalfield: Drive on Magnolia, 11·7; Drive on Uitzicht, 8·0. Generalising, it may be said that, about Newcastle and Dannhauser, the ratio of the unaltered coal is 2; in the Hatting Spruit, Dundee and Wessel's Nek districts, 3·5; somewhat less, say 2·5, about Elandslaagte; while on the Greytown Coalfield the coal is anthracitic, the ratio being about 10 to 1.

Travelling south-eastward from Newcastle, we have ratios at Utrecht, 2·6 and 2·2; Makatese Kop, 2·8; Paulpietersburg, 4·2; Hlobane, three seams, 4·3, 3·8 and 3·6; Vaalbank, 4·6; Nongoma, 7·8; Outcrops eight miles inland from Somkeli, 9·2, 2·7 and 2·0; Zululand Colliery, 10·1, 12·8 and 11·4. It may be said that in the Utrecht district the ratio is about 2·5 to 1, and near Hlobane about 4·0.

It is harder to generalise with regard to the Zululand Coalfields, as the local disturbances and variations are greater, and comparatively little development work has been done. I have one analysis only from near Nongoma. About Somkeli nearly all the coal is anthracitic, and the ratio may be put at 10, but eight miles further inland, where the limit of the decidedly tilted strata is reached, semi-bituminous coal has been found. At Ntambanana the ratio is about 5 to 1. On the Umlalazi field the results are very variable, for though a little of the coal is very bituminous almost all is so altered as to be anthracitic.

Turning to the matter of ash, we have analyses showing percentages:—Newcastle, 11·5; No. 42, 14·6; Durban Navigation, 11·0; Natal Navigation, 10·0; Glencoe, 12·8; Natal Merthyr, 13·3; Central, 12·9; Elandslaagte, 18·5; Elandslaagte bottom seam, 15·2; Magnolia, 16·4; Uitzicht, 14·0; Utrecht, 7·6 and 7·9; Makatese Kop, 8·2; Paulpietersburg, 11·8; Hlobane, 13·1, 12·8 and 9·0; Vaalbank, 11·0; Nongoma, 2·95; eight miles from Somkeli, 22·4, 28·9 and 17·0; Zululand Colliery, 15·0, 10·1 and 16·3; Ntambanana, 19·6; Umlalazi from 18 upwards. Generalising, it may be said that, on the Klip River Coalfield from Newcastle to Wessel's Nek, the percentage of ash is about 12, but at the southern end of the coalfield, Wessel's Nek and Elandslaagte, where a few collieries work the upper seam, the percentage is somewhat higher. On the Greytown Coalfield there is about 15 per cent. of ash. In the Utrecht district the coal is exceptionally clean, the figure being about 8; while in the Vryheid district the average may be put at 12, the same as on the Klip River Field. From Nongoma we have a sample giving a lower percentage of ash than any other South African coal I am aware of. At Somkeli the average may be about 15·0. On the Ntambanana and Umlalazi Fields the coal is usually very dirty.

The percentage of sulphur present in the same seam varies irregularly within short distances, but there is some indication of variation on a larger scale. On the Klip River Coalfields the general percentage is above 1·5; on the Greytown Field, 3·0; Utrecht district, 1·0; Vryheid district, 0·5; and at Somkeli, 0·5.

It seems clear, when consideration is given to the way in which the carbon ratios and the percentages of ash and sulphur change as the seams are followed from district to district, that there have been general influences affecting the seams over large areas, apart from purely local influences such as igneous intrusions. Probably those general influences, at least in the Klip River, Utrecht, and Vryheid districts, were original, that is to say, attendant on the conditions of deposition. On the Zululand coast, the pressure and perhaps heat accompanying tilting and faulting of the strata observed in that portion of the Colony probably have affected the seams. Near Greytown the alteration is not improbably due to pressure also, though the seams are nearly horizontal, as the conditions appear to resemble on a large scale those observed on a small scale at the Impati Mountain near Dundee. In that isolated mountain the coal seams lie almost horizontally at a level about 300 feet higher than the same seams in the surrounding country. It seems clear from inspection of the slope between the seams and the dolerite sheet forming the top of the mountain, that the overlying dolerite is too far above to account for alteration of the coal, while a borehole put down to a depth of 156 feet below has shown no igneous rock, yet the coal is anthracitic, the ratio of fixed carbon to volatile hydrocarbons being 10·6 to 1. I attribute the alteration of the seams to the pressure which has raised the mountain and seams above the surrounding country.

GOLD.

I will now pass on to deal very briefly with the deposits of gold in the Colony. Though up to the present that metal has not been worked successfully on any large scale, it is very widely distributed, and I am sure that sooner or later profitable mines will be established.

The known deposits are most abundant in north-western Zululand, that is, approximately, in the centre of the Colony. I have had reliable information as to the occurrence of gold in practically every geological formation in Natal from the Gneiss to the Stormberg beds, but the most important known deposits are in either granite or gneiss, the Swaziland schists, the Witwatersrand series, the Black Reef series, or the Table Mountain sandstones.

Granite and Gneiss.

A belt of granite and gneiss extends from near Port Shepstone through Botha's Hill on the railway, into the Eshowe district of Zululand and through the Ngoye Mountains to the sea coast. Another belt passes northward from Zululand through the Babanango Division and under the Vryheid coal measures to Luneberg, on the Transvaal Border. It is probable that the gneiss is the oldest formation in the Colony, although the fact is obscured owing to the gneiss being locally altered into granite, which is in places extruded into the Swaziland schists.

Gold, in quartz reefs in the gneiss, is now receiving attention near Umzinto, and near Mpapala, in the Eshowe district. At Dumisa, near Umzinto, several thin rich quartz leads occurring in a sheared belt of hornblendic gneiss are being mined, and near Mpapala large reefs cased in granite are being opened up. In connection with the Dumisa reefs it may be noted that the quartz contains a large proportion of sulphide in depth, the sulphide being in the form of marcasite, and some at least rich in gold.

A few miles from Dumisa, a gold-bearing quartz reef known as the "Happy Thought," formerly worked by the Natal Gold Mining Coy., is interesting in view of the theory as to the connection of some gold reefs with granitic extrusions, as the reef contains felspar and mica.

Pockets of clay rich in gold have been found overlying the gneiss in several places, having no apparent possible connection with any quartz reef. At Signal Hill, near Eshowe, the gold found in the surface soil is in the form of wire gold.

SWAZILAND SCHISTS.

The Swaziland schists do not appear in Natal proper except close to the Zululand border, but in Zululand and in the Northern Territory they are found flanking the gneiss.

Gold is very widely distributed in the schists, as, for instance, in the Tugela Valley, the Lower Insuzi Valley, and the Vungwini Valley, and near Melmoth, Nondweni and Paulpietersburg. The schists are mostly fine grained and chloritic, but sometimes, especially near the gneiss, they are coarser and hornblendic.

The variety in character of the gold-bearing reefs in schist is so great that it is impracticable to do more than refer to a few examples. Households Reef, near the junction of the Buffalo and Tugela Rivers, consists of a series of quartz bodies in a particularly distinctly laminated layer of chloritic schist. The quartz bodies are lenticular in horizontal section, but are apparently elongated in depth, resembling crooked flattened columns. No doubt the reef follows a line of shearing parallel to the foliation of the schist. The Phoenix Reef lower down the Tugela is similar in character to Households, but the casing is a coarser hornblende schist. The Enterprise Reef, at Nondweni, so far as it has been opened, consists of one large lens of dark bluish glassy quartz as much as 26 feet thick at one place. It has been driven along for a distance of 740 feet, which is probably almost the full length of the lens. It appears most probable that the reef lies along a line of shearing which has been opened by subsequent end pressure on the strata. The Sisters Reef at Nondweni is of a different type, lying, as it does, along the under side of an interbedded basic dyke. Most of the quartz veins in the schists appear to owe their origin to the opening of the folia of the schits, by either end pressure or folding.

What is known as the Sisters' "Hill Formation" is of special interest to the geologist. It crops out as a great bed or vein in the schists, with a width at one place of as much as 120 feet, and consists mainly of silica and carbonate of iron with some chlorite. Numerous small and irregular quartz veins, many of which are rich in gold, ramify through the body, converting it into a "stockwerke."

Though the unweathered rock is extremely hard it weathers very rapidly, leaving a network of quartz veins standing.

WITWATERSRAND SERIES.

The strata which I believe belong to the Witwatersrand series are exposed, in the Buffalo Valley a short distance above its junction with the Tugela, in the upper portion of the Insuzi Valley, in the Umhlatuzi Valley near Nkandhla, in the Valley of the Pongola River near Paulpietersburg and Louwsberg, and in a few smaller areas elsewhere. The series consists, in the Colony, of alternating beds of quartzite and schist, with occasional beds of gold-bearing conglomerate. The beds are invariably much folded, with the axes of the folds running approximately east and west. The reasons, apart from authority, leading me to place the beds in the Witwatersrand series are:—

1. Their relation to the Swaziland schists which frequently underlie them, and to the Table Mountain sandstone and Dwyka conglomerate which in different places overlie them directly but unconformably.
2. Their petrological character.
3. The absence of granite intrusions.
4. The presence of dykes exactly similar to the older dykes on the Witwatersrand.
5. The presence, in the lower portion of the series, of beds containing much magnetite and similar in character to the to the Hospital Hill shales.
6. Their age, which is apparently greater than that of less completely metamorphosed and little-folded beds containing gold-bearing banket, which may correspond to the Black Reef series.
7. The presence of gold-bearing bankets.

On the Upper Insuzi Goldfield, which has been studied by Mr. J. S. Hedges,* of the Natal Mines Department, the beds are folded into three synclines, which may be termed respectively the Upper Insuzi or Dickson syncline, the Central Insuzi syncline, and the Ntingwe or Speedwell syncline. It may be remarked in passing that, on the Insuzi Goldfield and elsewhere in Natal, there are no anticlines in the Witwatersrand series, the synclines butting against one another along lines of faulting. It is not certain what relation the beds exposed in the three synclines have to one another, but it seems probable that those in the Upper Insuzi syncline are the oldest, and those in the two other synclines of the same, somewhat more recent, age. The Hospital Hill shales do not appear, so far as I am aware, in the Insuzi Valley.

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* Mines Department Report, Natal, 1903.

In the Umhlatuzi Valley, separated from the Insuzi by the Empandhleni ridge, the formation is similar to that on the Insuzi, but on the Nkandhla side of the Umhlatuzi River it shows remarkable side folding. Magnetic rocks similar to the Hospital Hill shales are found a short distance higher up the river.

In the Pongola Valley the folding is not so sharp as in Zululand, but still very decided. The goldfield has not been carefully studied, but it is known that there are at least two synclines, viz., one terminating about the farm Bellvue, with its axis towards Piet Retief, and the other with its northern limit about the junction of the Pongola and Pivaan Rivers.

The relation of the magnetic Hospital Hill shales, which are being exploited with a view to the establishment of an iron industry, to the quartzites and schists of the series, is very plainly shown on the farms Bellvue and Paris, while between Paulpietersburg and the western limit of the series the Swaziland schists are exposed.

Important gold-bearing banket reefs have been found in the series on the Upper Insuzi and Umhlatuzi goldfields only, the banket reefs found up to the present on the Pongola Field being poor.

In the Insuzi the most important reefs are the Dickson, the Dickson North Reef, the Central, the Delaney, and the Speedwell. The Dickson is a large pebble banket lying between schist and quartzite. It is as a rule thin, but always rich in gold content. The other reefs are all small pebble bankets, and poorer in gold content. Though the Delaney Reef is low grade, it is remarkable for the frequency with which visible gold has been found in its quartz pebbles. I do not know of such discoveries in any of the other banket reefs.

The gold-bearing quartz reefs in the series are not very important. The Wonderfontein Reef, on the Pongola, is a white quartz reef containing gold associated with lead minerals. It is an interesting example of the occurrence of gold in what is known to the prospector as "hungry" quartz. In the Upper Insuzi the "Haematite" or "Muller's" Reef lies at the junction of the quartzite and schist, the quartzite being partly replaced by the quartz. Most of the gold in the reef occurs in pockets of haematite, which are frequently of cubical form and perfect pseudomorphs after pyrites. Some of this haematite is very rich in gold.

BLACK REEF SERIES.

The Black Reef series appears at the southern end of the Nondweni Goldfields, and near Denny Dalton and Ulundi. The beds are quartzites and shales or schists, with thick banket reefs. The principal reason for considering the beds to be more recent than the Witwatersrand series is that, though they are distinctly tilted, the dip is always slight, while the Witwatersrand beds in the Colony are much folded. Unfortunately there does not appear to be any place where the relationship of the two series can be observed directly, for both at Nondweni and Denny Dalton the Black Reef series lies directly over granite. The rocks in the supposed Black Reef series do not appear to be so much metamorphosed as in the Witwatersrand series, but that might be accounted for, apart from the difference in age, by the smaller amount of folding. The series at Denny Dalton is undoubtedly older than the Table Mountain sandstones, for the Table Mountain sandstones at a higher level in the Entonjaneni hills near by are only slightly metamorphosed and lie horizontally. Dwyka conglomerate lies directly over the Black Reef series near Nondweni, Denny Dalton and Ulundi. The bankets appear to be coarse with little secondary silica. They are low grade except in portions of the reef in the Denny Dalton Mine.

TABLE MOUNTAIN SANDSTONES.

The Table Mountain sandstones are well developed in Natal on the coast side of a line running from the centre of Alfred County to Ulundi in Zululand.

In Alfred County they are white friable sandstones, closely resembling the coal measures in appearance, but distinguished from them by the presence of overlying Dwyka. Near Umzinto they become red and hard owing to the presence of a siliceous cement, becoming soft and friable again in Zululand though still in great part red in colour. Gold is widely distributed in small quantities, but the place at which most is known of its occurrence is in Victoria County near Chaka's Kraal and Stanger. The gold occurs in almost vertical quartz reefs, apparently following lines of faulty and subsidiary fracturing, and also in interstratified beds of conglomerate and sandstone. The gold-bearing sandstones and conglomerates, where unweathered, are pyritic; and the gold is apparently very irregularly distributed in them.

It is interesting to note that the gold occurs in the sandstone in two forms, viz., coarse, almost cubical and dark in colour, and fine and lighter yellow in colour, resembling the gold from "banket," but with some pieces of wire gold of similar colour. The coarse gold is found in weathered stone, and the fine in unweathered, and there seems reason to think that the coarse gold has been formed by secondary action.

In conclusion, I would redirect your attention to the following matters upon which I have touched:—

1. The geological position of the Natal coal seams.
2. The desirability of distinguishing the coal measures by a distinct name from other portions of the Ecca or Beaufort series.
3. The position of the coal seams in relation to the limits of the coal measures, and to the Dwyka conglomerate.
4. The variations in the sections of the coal seams and in the composition of the coal, and possible explanations of the variation.
5. The presence of the Witwatersrand series in Natal.
6. The presence of the Black Reef series.
7. The relation of the Table Mountain sandstones to the Witwatersrand and Black Reef series.
8. The occurrence of synclines without anticlines in the Witwatersrand series.
9. The occurrence of gold in the Table Mountain sandstones.

I cannot claim that I have dealt satisfactorily with these various matters, but my purpose will be served if I have brought to your notice some few facts not generally known; if I have given you material in the discussion of which you can bring your knowledge gained elsewhere to bear; and if I have in the slightest degree induced further geological investigation in Natal.

The growing of fodder crops for fattening sheep and rams has long been the general practice of the husbandmen of New Zealand; and to this is owing almost entirely, remarks the *Live Stock Journal*, the high standing the New Zealand frozen lamb and mutton has occupied in the London market. "Cape barley, rye, tares, oats, crimson clover, and Italian rye-grass have been the sheep-farmer's salvation."

Seventy years ago practically no rubber was used in the United States. At the present time that country is using quite one-half of the world's production, and rubber has now come to be regarded as a necessity of life. In transportation and communication its value is perhaps most felt, as, for the purposes of transportation under progressive conditions on the railway train and on the automobile, for purposes of insulation for electrical communication and lighting, etc., it is an absolute essential for which there is no substitute.

Cacti as Food for Stock.

AMERICAN INVESTIGATIONS.

ONE of the conclusions that forces itself upon anyone who studies the economics of agriculture in this country is the necessity for one day relinquishing the present system of winter and summer farms in connection with stock farming, and for the adoption of more modern methods of winter feeding. The present system is, of course, the outcome of the conditions attending the early settlement of the country; but as farming gradually grows more intensive in every way, through economic pressure, methods in vogue in other countries for the provision of winter feeding must sooner or later be adopted by farmers in Natal. The Department last year collected statistics of the acreage set aside for winter fodder; and it is intended to continue the collection of such data from year to year, in order to ascertain what progress is being made. The area set aside for the purpose last year was 7,012 acres.

The need is, of course, for the provision of artificial fodder, to obviate the annual trek. In the light of such a need, readers may be interested to learn what progress has been made in investigations—conducted chiefly in the United States—into the food value of "prickly pear" and other cacti for stock. In recent publications issued by the U.S. Department of Agriculture, the value of the cacti as forage plants has been demonstrated; and investigations have been conducted in cooperation between the Office of Farm Management Investigations of the Bureau of Plant Industry and the Agricultural Experiment Station of New Mexico for the purpose of determining, if possible, the extent of variation and the nature of the food constituents of the different species which are likely to be utilised as food for stock. Part I. of Bulletin No. 102 of the U.S. Bureau of Plant Industry, prepared by Messrs. David Griffiths and R. F. Hare, contains a summary of recent investigations in this direction.

The plants are grouped under three headings—prickly pears, cane cacti, and miscellaneous—the first group being by far the most important, though the second is largely utilised in districts where its different representatives grow. The third group consists of miscellaneous species from other cactus genera, which on the whole are but little utilised as stock feed, although some of the species have been fed in rare instances. Samples of cacti were collected for the purpose of subjecting them to analysis, in preparation for which they were first sliced open in such a way as to expose a maximum of cut surface, and then dried by artificial heat at a temperature of not more than 70 deg. C. The spines were then singed off by a small flame of complete combustion, care being taken neither to deposit combustion particles upon nor injure the specimens.

The amount of water in the different samples analysed varied from 60·99 to 95·5 per cent. The miscellaneous group is relatively more succulent than the other two, the average amount of water being 87·88 per cent., while the prickly pears averaged 84·26 per cent., and the cane cacti 78·47 per cent. As a rule, the fruit contained more water than the stems and the younger growth more than the older. The difference in the species in the field during a dry and a wet season is very marked, and even prickly pear has its limit of drought endurance. Experience in southern Texas, it is stated, demonstrates that it is much reduced in value during very prolonged dry seasons, for it becomes tough and leathery.

The average ash in the air-dried stems and fruits of the prickly pears analysed amounted to 18·25 per cent., for the cane cacti 15·5 per cent., and for the miscellaneous group 13·54 per cent., one sample running as high in ash as 33·8 per cent. of the air-dried substance. These averages, it is remarked, would be still higher if they did not include the ash of fruits, which always contain less ash than the stems. The elements of the ash are present in about the same proportion as in the ash of other plants, except potassium, magnesium, and calcium, which are found in large amounts. It is probably the presence of these salts, it is thought, coupled with the high water content, that causes cattle to scour when fed on an exclusive roughage ration of these plants.

The opinion is prevalent in Southern Texas that the old woody stems of *Opuntia lindheimeri* fed there are much more valuable as a stock food than the younger growths. So firmly do many believe this that they practise cutting off and throwing away two or three of the terminal joints when feeding. In Mexico, on the contrary, the young growth is always fed; but there the species are commonly much larger and stouter, and the trunks are altogether too woody to be fed even if it were desirable to do so. Analysis showed, however, that the younger growth has a relatively higher water content, and therefore probably causes more scouring, which is the only evil influence overcome by a rejection of it. On the other hand, the old stems contain a much larger proportion of fibre and are really of less forage value.

To determine in what proportion cactus should be fed with other foods to produce a balanced ration, it is necessary to know the amount of digestible nutriments contained in the cactus, as well as those of the food or foods with which it is to be fed. This has been determined for most foods, but unfortunately there are as yet no such data for the cacti. By assuming, however, that this digestibility coefficient is the same as that of immature green mealie fodder, the authors find the nutriments in *Opuntia lindheimeri* to be: Protein, 0·47 per cent.; fat, 0·26 per cent.; carbohydrates, 7·85 per cent. This being the case, it is added that cactus would have a nutritive ratio of 1 : 18, a ratio which, according to the best authorities, would prohibit its use alone for any feeding standard. The nutritive ratio for a standard ration, it is pointed out, varies from 1 : 4 to 1 : 12, depending upon the age, character, and kind of animal to be fed, as well as the object of the feeding: that is, whether it is desired to produce work, flesh, or milk. If the object of the feeding is to produce milk, a cow giving a heavy yield of milk should, according to the best authorities, be fed about 25 to 30 pounds a day of organic matter, containing from 1·8 to 2 lbs. of digestible protein, from 0·4 to 0·7 lb. of digestible fat, and 11 to 13 lbs. of digestible carbohydrates, making a nutritive ration of from about 1 : 5·5 to 1 : 7. If a cow requiring a ration of this kind should eat cactus alone, it would take 160 lbs. to furnish the fats and carbohydrates and an additional 240 lbs. to furnish sufficient protein; and since, to avoid scouring, a cow should probably not be fed to exceed 50 or 60 lbs. of cactus a day, it may be readily seen how impossible it would be for a milk cow to get even a one-sided ration from cactus alone. A ration of 40 lbs. of cactus with 10 lbs. of wheat bran and 12 lbs. of mealie stover would, it is stated, furnish the nutriments in somewhat near the proper proportion. In a ration of this kind the cow would get 21·16 lbs. of organic matter, containing 1·68 lbs. of protein, 11·82 lbs. of carbohydrates, and 0·49 lb. of fat, which is in a ratio of 1 : 7.7.

With regard to the relative value of the three groups of cacti, the authors point out that, on account of several considerations, the prickly pears are much more value than either of the other two groups. They are more numerous in the wild state, they adapt themselves to cultivation more readily, make a more rapid growth, and are more readily propagated from cuttings, all of which considerations are of vital importance in the economic use and handling of the crop.

Practically all the Mexican prickly pears are fed to stock to a greater or less extent, especially those growing where the fodder is the most scarce, but there is only one cylindrical-jointed species (*Opuntia imbricata*) which is used to any appreciable extent. The authors state that their experience has shown that *Cereus giganteus* is readily eaten by cattle when chopped up, but add that they know of no feeding having been conducted with it on any commercial scale. *Echinocactus orcuttii*, which is typical of a considerable group of species, is occasionally fed in Lower California. It is only in rare instances, however, that any great quantity of feed can be secured from cacti, outside of the genus *Opuntia*, and the greater part of the feed in this genus is stated to be produced by the flat-jointed forms. There are about five species in the cylindrical-jointed group which have been fed with some success: *O. imbricata*, *O. arborescens*, *O. spinosior*, *O. fulgida*, and *O. prolifera*. These species constitute the best of the cylindrical-jointed group; and of these *O. fulgida* and *O. imbricata* are said to be probably the most valuable.

In the course of another bulletin, prepared by the same writers and issued from the Agricultural Experiment Station, New Mexico, some particulars are given of the use of prickly pear in Mexico. In that country the use of the prickly pear is much more varied than in the United States. All the species are fed to stock indiscriminately. Whatever is available and can be spared is singed and fed to cattle. The extent of cattle-feeding upon this kind of food is not, however, so great in Mexico as one would suppose from the abundance of the material and the great extent of time during which the practice has been in vogue. The fact is, it is stated, that the average peon cannot afford to feed to stock what he himself can use so profitably in other ways. The prickly pear is to the peon primarily an article of human food, and its place cannot be taken by any other plant. The fruit, as well as the young joints, are eaten by man in Mexico, and the dried stems and joints are used for fuel. The fuel which it makes is, of course, exceedingly poor, but it serves the purpose in that land where this commodity is exceedingly scarce. The feeding of cacti to stock is, therefore, a secondary consideration. On some of the large haciendas, especially those devoted to maguey culture, the feeding of pear to working oxen during the grassless season is a regular practice, but then only wild forms are used. Over a large part of the Republic, therefore, although a large use is made of them for forage, their principal use is as an article of human food.

TICK FEVER AND ITS PREVENTION.—In a paper on "Some Investigations into Tick Fever and means for its prevention," by the Government Bacteriologist, Queensland, the author arrived at the following conclusions:—(*a*) Careful dipping with properly prepared mixtures will effectually destroy the majority of ticks upon an infested animal. (*b*) Systematic dipping will prevent tick worry. (*c*) Continued dipping will not prevent cattle from being attacked by the disease, "tick fever." (*d*) Susceptible animals may be rendered immune by inoculating them with blood from a recovered animal. (*e*) The losses from the inoculation fever vary from nothing to eight per cent., according to circumstances, particularly the age of the animals. (*f*) By protective inoculation over 90 per cent. of cattle are saved. (*g*) In uninoculated cattle the losses may range to as high as 100 per cent. These remarks do not, of course, apply to "East Coast Fever."

Agricultural Education in South Africa.

A PAPER READ BEFORE THE SOUTH AFRICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

By E. R. Sawer, Director, Experiment Stations; Principal, School of Agriculture, Natal.

In the course of a paper delivered before the British Association in 1905, the Director of Agriculture in the Transvaal apologised for the choice of so hackneyed a subject as the teaching of agriculture; and to-day I would enter the same apology, and advance the plea that the reasons which then demanded consideration of the problem have lost none of their force. South Africa continues to stand in urgent need of the assistance which a sound and comprehensive system of agricultural education could give, and we cannot forego the benefits of your counsel and support in face of the obstacles which have to be surmounted. Indeed, I would go further and urge that the annual session of this Association affords to students and teachers of agriculture an invaluable opportunity for gathering up the results of our yearly experience, of contrasting methods and results, and for obtaining that strength which comes from unity. We require a broader conception of the great work in which we are engaged, and the sense of a community of purpose.

In 1905 materials for an introductory chapter to the history of this movement were alone forthcoming; the Cape Colony being the only country in South Africa which had seriously attempted to provide agricultural education through the medium of a residential college. The leaders of agricultural thought were consequently concerned with the compilation of suggestions and principles for the guidance of those upon whom the responsibility of organisation might fall. In the interim practical application has been made of this counsel, and to-day it is possible to report some progress along the lines earlier indicated. To an Agricultural College at Elsenburg, the Cape Colony has added a School of Forestry at Tokai, the accommodation provided at the School of Agriculture in Natal has been strained to meet applications for residence, and active steps are being taken for the completion of similar institutions at Potchefstroom and Frankenwald, in the Transvaal. The nucleus of teaching centres is also to be found in the experiment stations which have been established at various points in the Orange River Colony and Rhodesia, while official journals and the public press continue to afford an increasing number of channels for the communication won.

While the Governments of the various Colonies are thus pursuing an enlightened policy as regards agriculture, economic conditions are lending a further impetus to the new movement, and compelling support from the professional and industrial classes, who, strange to say, have never hitherto warmly sympathised with the object of this education. A solution of the momentous problem of local industrial stagnation is now, however, being generally sought in the diversion of labour from the arts and crafts to agriculture, for it has been recognised that agrarian settlement is the only available means through which industrial equilibrium can again be secured. The disasters which have too often followed the introduction of penniless and untrained settlers have further convinced thinking men that no useful purpose can be served by a repetition of such experiments, and that lack of capital can only be compensated by a thorough technical training for the adopted profession. The personnel of agricultural students affords a clear index to these economic conditions and the urgent and increasing need for a thorough and inexpensive ground in the theory and practice of scientific farming: men of twenty-eight and thirty years of age, fully qualified to pursue other professions and callings, are now turning their attention to the unlimited possibilities awaiting the progressive farmer in South Africa, and abandoning earlier provinces where the horizon has been narrowly confined by economic re-action from an artificial and inflated prosperity.

On the other hand the farming community is realising the pressure of competition from without, and falling prices within; is being brought through the medium of agricultural literature and personal observation into closer touch with the results of agricultural progress in other parts of the world, and is beginning to recognise that with a denser agricultural population and enhanced land values, a system of more intensive cultivation and stock-management, and the adoption of methods employed by their competitors are essential to continued success.

The functions of the modern Department of Agriculture resolve themselves into administration, research and education, and it is the establishment of an effective relationship between the two latter which I would wish to bring under discussion to-day. Such relationship embraces the bridging of a gap which unfortunately divides the investigator from the farmer. The student and teacher has to be connected on the one hand with the world of science, and on the other with the field of practical agriculture, and until a bond of sympathy can be secured with those for whom he is working, the results of his labours are largely nullified. That the fault lies largely at our own door I am not prepared to deny, but would rather enquire how such a situation can be obviated. The work of grafting on to the primitive methods in vogue in a new continent, systems based upon the accumulated knowledge of centuries of practice in the older countries, is no light one, and the very process of adaptation entails results which are welcomed by the intensely conservative adherents of the local school as confessions of failure. Such a sentiment can, however, be too often traced to a failure on the part of the investigator to appreciate the local peculiarities which have given rise to a fixed line of agriculture in a given section of country. The director of an experiment station cannot afford to ignore factors, but prior to the adoption of any fixed policy, should thoroughly acquaint himself with the needs of agriculture in the locality of his work, with the habits of thought of the farmers, with the difficulties with which they are contending, and with the mistakes they are making in their efforts to render their business productive and profitable, the time will then have come for the application of past experience to present circumstances, with which he will be thoroughly conversant, for the pursual of a definite policy to be strictly adhered to and pushed with energy, and for the organisation of a system of education. In some parts of South Africa much more advantage may be secured to the farmers by spending a liberal share of our resources upon the study of subjects of peculiar local interest than in dissipating the energies of the stations over so wide a field that none of the investigations can be carried to a successful conclusion. In Natal we are happy in the possession of small outlying farms devoted in the one case to investigations associated with irrigation farming, and in the others to the cultivation of such tropical crops as flourish in our coast belts, while stock management, the study of a limited number of staple crops, and constructive forestry receive attention at the Central Station. Past experience has shown that the farming community demands rather the settlement of one or two questions of paramount importance than an attempt to solve at once the innumerable problems with which we are confronted. Let none of our stations fail by undertaking too much. When organising experiments I am guided by the dictum: "The shortest way to do many things is to do only one at a time."

The organisation of an experiment station has been compared to the organisation of an army, being simply a corps of scientific workers, together with the necessary equipment, organised for a special purpose. It remains to be seen how far joint operations between the now isolated units scattered throughout South Africa may further the general object in view. Freedom of action is one of the prime essentials to all successful research, but there are numerous ways in which the large questions of agricultural science may be materially facilitated by union of effort. For the very reasons stated above, localised investigation is eminently desirable, the personal factor counts for much, and probably personal pride and ambition are the greatest stimulents to efficient work, which being the case, loss of identity in a common undertaking might entail the loss of motive force. On the other hand, there is undoubtedly continuous duplication of purely mechanical work in which no original thought is involved, as, for example, in the repeated analyses of commercial fertilisers and foods, where economy of time and labour might be effected by the partition of such undertakings in accordance with some well defined arrangement. A careful comparison of results obtained at different centres where a similar line of enquiry of common interest was being followed would also furnish material for the establishment of a School of South African Agriculture enjoying the authority and support of a number of investigators. The subject, however, is one to which justice can hardly be done in the time at my disposal, and I shall later take the opportunity of suggesting that a committee be appointed under the auspices of this Association to take into consideration a system of co-operation between workers in the field of agricultural research. It would be presumption on my part to offer any opinion upon the methods of research to be adopted, and it is rather with the means by which effect may be given to results that I am immediately concerned. To communicate his news in intelligible form to those by whom it is to be put to practical effect, is as much the duty of the investigator as the conduct of the experiments from which it has been derived, and frequently by no means the least difficult part of his task. We have frequently to meet the question, "What are our experiment stations? What are they doing for the farmers?" And a satisfactory response can only be given in the form of acceptable advice, which shall be the direct or indirect means of increasing the productive capacity of the agricultural industry.

As a medium of communication, the Agricultural College has so many advantages that it has come to be regarded as almost an essential complement to the Experiment Station. Our students are valuable agents for bringing us into contact with the farming community at large, and their influence in the dissemination of new ideas is far reaching. The necessarily limited duration of their residence is an advantage in that it is possible to present to, and impress upon, a larger number the fundamental principles of scientific agriculture. In this connection I would urge the desirability of as many special courses, open to others than regular students, as the staff with its equipment can render effective and complete, for the personal relations established in such short technical courses go far to remove misunderstandings and to win the confidence of the farmers. Much has been written and said about the ideal training to be adopted, and the wide divergence of views observed can only be explained by the varying circumstances to which they are attributable. A progressive modification in the curriculum of our local Colleges is anticipated, for at the present time an urgent demand exists for a short and relatively complete training by many who have but a limited time and still more limited means for equipping themselves for an agricultural career. It should, however, never be forgotten that the main purpose of such a training is *education*, the "training of the mind so that the hand shall manipulate with accuracy, the eye shall see with accuracy, the mind shall think with accuracy, and all the powers of brain, eye, and hand shall work in unison to increase and enlarge the productive capacity of the earth, to cheapen the means of subsistence, and thus to give man more leisure." That short courses call for less preparation and equipment is a fallacy which will not be entertained by any who may have had experience of what have been called popular lectures. The compulsory elimination of matter valuable in itself, but of less immediate importance to those whose interests are at stake, is a task calling for the exercise of the utmost discretion, while the power of combining thoroughness with precision is one enjoyed by a very limited number of teachers. Such emergencies and the peculiar features of South African farming lead to a demand for the best obtainable equipment for practical demonstration and manual training. Practical demonstration is the short cut to a given end in tuition, and manual training of diverse character has an enhanced value in a sparsely populated country where farms are situated at a distance from industrial centres, and means of communication are as yet primitive.

In accordance with such considerations, and while never losing sight of the higher object to be served by agricultural education, to wit, the development of intellect in students, practical training plays a large part in our own system, including, as it does, a grounding in the practice of dairy-work, engineering, carpentry, building and farriery.

It was frequently been urged that if the station staff be doing its duty, it has little or no time for anything else, and if the members of a College Faculty be as fully occupied, as they generally are, they have little or no time that can be devoted to the station work without doing injustice to the College. A partial solution to this difficulty has been secured by the co-operation of experts attached to the respective departments of agriculture, but a strengthening of the teaching staff at all centres is an undoubted desiderium. It has, however, been found possible to conduct many experiments in such a manner as to utilise the intelligent labour of students, to which course I cannot see that any reasonable objection can be raised.

To teach at first the few and then wait patiently for the seed so scattered to spread from comparatively few centres is a method which will not commend itself to those who appreciate the vital necessity of hastened progress in agricultural development, and other channels of communication must be sought, reaching those who are actually engaged in farming and consequently unable to avail themselves of collegiate instruction. At the outset the means chosen must bear definite relation to the character of the people we wish to reach. Throughout life the farmer's occupation stimulates the power of judgment and observation: they have been learning by seeing, and in few cases will extract much from letterpress or unillustrated addresses. Concrete facts are always in order, and lantern lectures, exhibitions, diagrams, and pictures are the media through which information is to be conveyed. The graphic method of illustrating results can hardly be used too frequently.

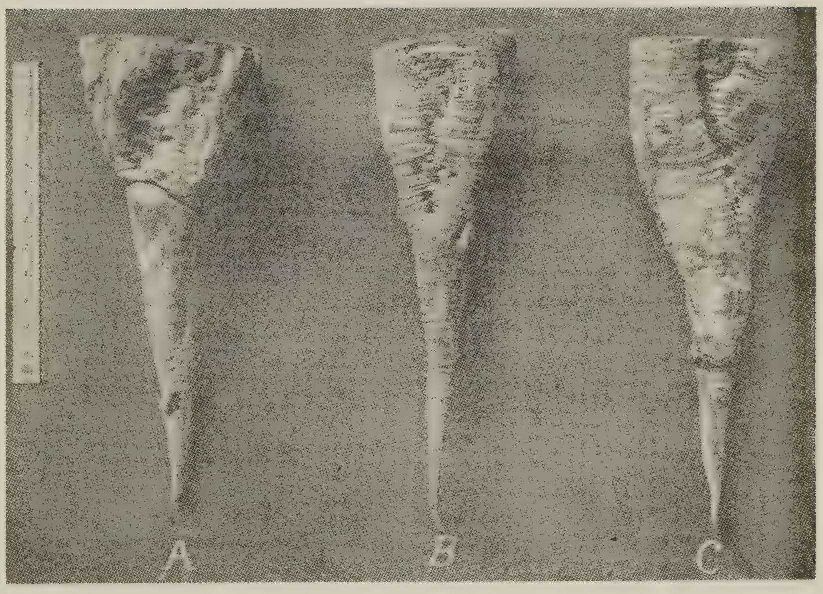
Lectures at a number of centres, agricultural shows and conferences, bring with them the advantages of personal intercourse which can hardly be over-rated, but to place facts and information at the disposal of the whole farming community with the least possible delay, recourse must be had to publication in some form or other. What to publish and how to publish, are questions deserving careful consideration. In South Africa the departmental journal has attained an importance hardly surpassed in other parts of the world, and anyone who has had the privilege of editing a periodical of this character cannot but be struck by the immense influence exerted through such a medium. One also learns that its value is largely commensurate with the number and character of the illustrations. A picture, or diagram, to every page of letterpress, though adding considerably to printing costs, is an allowance calculated to gain the desired end, which is careful attention to all contained matter. The bulletin, dealing with a single subject, or even a single aspect of a given subject, to which it is desired to call particular attention, forms an invaluable supplement to the journal. If it is to serve its purpose it must be brief, not exceeding four or six pages if possible, and including at least one striking illustration, which is better printed on the cover. This should be sent gratis to all farmers making application for same, but not broadcast, or it at once sinks to the level of a patent medicine advertisement. The more frequently we send out short bulletins the better. In addition to journal and bulletin, some annual publication is required in which to permanently record for the information and later use of all workers in the field of agricultural research the great mass of data which is collecting all the time. The contents would not be interesting to farmers, but absolutely essential to station men in determining the value of conclusions. The value of such a year-book, of which a limited issue only would be required, would be greatly enhanced if it were possible to include within its province the whole of British South Africa. From such a treatise and other sources it would be further possible to compile a "Farmer's Handbook for South Africa," containing figures and data in tabular form, to the individual sections of which it should be possible to secure the contributions of specialists.

Before closing this paper I would wish to pay a tribute to the aid which is being lent by the progressive public press in South Africa to the cause of agricultural development, and to acknowledge the value of these journals in the work in which we are so much interested. It behoves all investigators to cement a bond of common interest and good understanding, which will result in making our work far more effective than if two great educational forces worked on independent and disjointed lines. Farmers believe in the paper they patronise, and we cannot do better than choose a medium in which he has confidence. It may often be possible to reach large numbers of men through the vehicle of the daily papers, who would never read an official publication;

and I am confident that our journalists would be, and indeed are, only too happy to publish at least a digest of the current researches and discoveries in agriculture.

It has only been possible in the time at my disposal to endeavour to set in motion a train of discussion which may serve to enlighten those of us who are engaged in pioneering the cause of agricultural education in South Africa. I have purposely given small place to the individual difficulties encountered, for here each must work out his own salvation, and, when all is said and done, success will always depend rather upon the men than upon their visible resources—"*Pater ipse colendi viam haud facilem esse voluit.*" Much of the most valuable agricultural research has been accomplished in the face of what appeared to be almost unsurmountable obstacles, and I am here to-day rather with a plea for organisation for some closer bond between our only too limited and scattered numbers, whose very paucity demands concerted action. This project is therefore left in the hands of members present, whose decision, I feel confident, will be that it is not foreign to the objects of our Association.

Forcing Plants with Anaesthetics.—An account of some amazing results which have been obtained from drugging plants is given by Mr. Clarke Nuttall in *World's Work* for July. Dr. Johannsen, of Copenhagen, was the first to find that anaesthetics applied to plants accelerated their development. A lilac put under ether or chloroform and then subjected to suitable conditions of growth, will, it is stated, far more quickly gain its full maturity of beauty than if it had not been drugged. The moment that plants are released from the anaesthetic they begin to put forth buds, and development proceeds apace. Lilacs prefer ether, lilies of the valley chloroform. There is said to be a universal consensus of opinion that this anaesthetic process is the most advantageous for the purpose of increasing growth and for producing finer and more luxuriant flowering. The theory offered in explanation by Dr. Johannsen is that when a bud is formed in summer in preparation for the following year, it passes through three stages of rest: initial, until September (*i.e.*, in the northern hemisphere); complete, until the end of October; final, until the end of January. He argues that, when a plant is anaesthetised, these periods of rest are, as it were, condensed and thus deepened in quality while shortened in time. It is as though a certain quantity of repose were essential, and it does not matter if it be taken in a concentrated form during a short space of time, or in a more diluted form over a longer interval. But the greater the intensification of the resting state, the more rapid and easy, it is said, is the recovery.



TYPES OF SUGAR BEET.

Perfect in shape and weight and properly topped.

(From Bulletin issued by Colorado Experiment Station.)

The Cultivation of Sugar Beet.

By E. R. Sawer, Director, Experiment Stations.

Originating as a hostile movement on the part of the first Napoleon against Great Britain, the introduction of a beet-sugar industry into the agricultural system of a country continues to involve far-reaching political, social and economic considerations passing beyond the province of the agriculturist. A somewhat natural British prejudice from the first existed against this culture, which has been fostered by the methods of economic warfare more recently adopted by European States. The competition of bounty-fed beet-sugar seriously menaces the very existence of the cane industry, and it becomes a question as to whether the latter can survive in many parts of the world without some form of fiscal assistance. With an internal market at his door this competition presses less heavily upon the Natal planters, though there is the same urgent necessity here, as elsewhere, for the universal adoption of the scientific methods and research which were from the beginning called to the aid of the beet industry, and have done so much to ensure its position of supremacy.

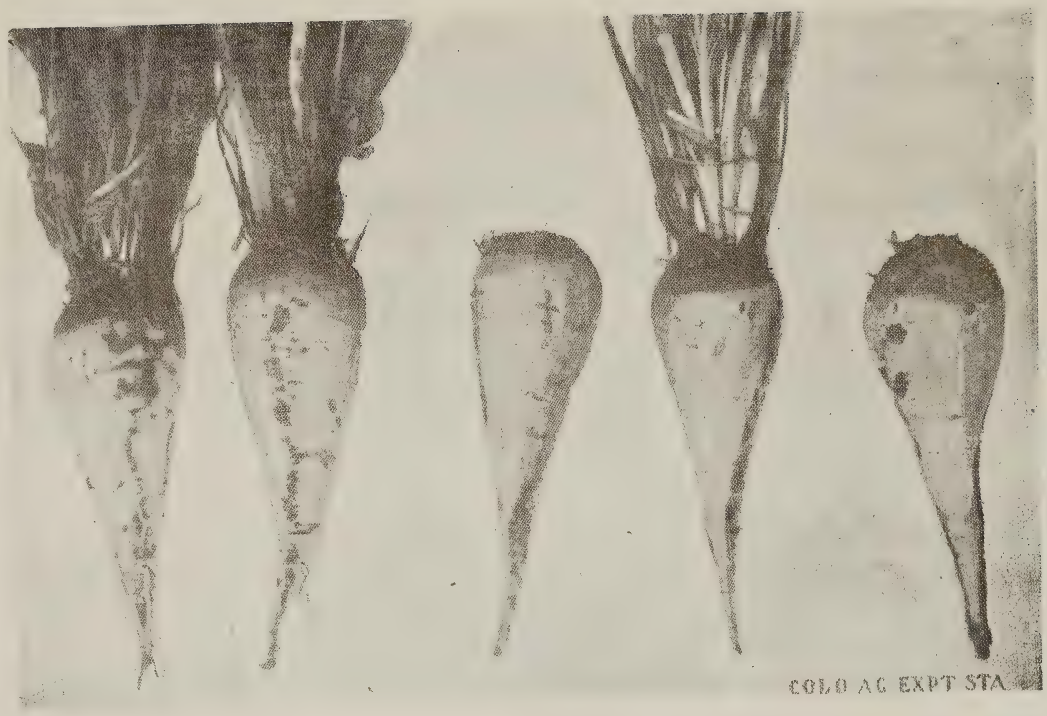
The beet sugar question has a further direct bearing upon the vital problem of the white man and the coloured races, for the sugar cane, with its tropical habitat, is naturally grown by the aid of the native labourer, while the beet industry is, and has been from the outset, a white man's business. The possibility of establishing the beet as a source of sugar side by side with cane in the well-nigh unique climatic conditions of Natal eliminates all fiscal and political elements and leaves us face to face with the domestic problem of two competing crops, representing on the one hand the activity of Europeans, and on the other the product of the plantation system. The prospect of internal friction is, however, redeemed by the fact that local and South African demand alone is more than sufficient to absorb any probable output from these combined sources. Such being the case, one is able to approach a proposition which has engrossed much attention during the past few months, from the standpoint of the agriculturist, and bring under preliminary discussion the many issues involved. For the history of similar enterprises in other British Colonies reads as a warning against premature action.

HISTORY OF BEET CULTIVATION.

Napoleon Bonaparte having closed European ports to British trade, and thereby cut off the sugar supply, undertook to supply Europe with sugar from beet. His measures were so vigorous that by the year 1813 there were no less than 334 beet factories in France. After Napoleon's overthrow the young industry almost died out; but its merits were such as to ensure its survival. By the year 1830 it was firmly re-established, and since 1840 has, under the stimulus of bounties, grown with rapid strides, so that it now furnishes two-thirds of the world's visible sugar supply, and controls the sugar market.

In 1879 the first beet-sugar factory in the United States was erected and put in operation in California, successfully, from a financial and every other standpoint, and to-day there are about about forty factories operating in that country, with a nominal daily capacity of more than 25,000 tons of beets and a yearly capacity of more than a quarter of a million tons of sugar. On the other hand, record must be made of numerous abortive efforts which, no less than the above, afford many useful lessons of the conditions which make for success. An experiment was tried in England a few years ago, but was abandoned when it was discovered that the production could not be made within reasonable limits of expense. The trouble was declared to be in the quality of beets, which did not yield enough sugar to justify the enterprise. After further experiment it is now claimed that a method of culture has been secured which produces a beet that will yield profitably, and a further effort is being made to establish sugar factories. This experience serves to accentuate the necessity for exhaustive field trials prior to the investment of the large capital required to set the industry on a firm footing.

In 1894 and 1895 the beet sugar question was thoroughly alive in the Australian Colony of Victoria; and those interested in it were divided into two camps. One party advised that careful investigations should be made, that the farmers should be educated in the growing of beetroot for sugar by means of prizes and so on, and that the different parts of the country should be thoroughly tested in order to determine the best locality for starting the industry. The other party urged that farmers would not trouble much about the matter unless there were a visible output for their produce, and advised the putting up of a big factory at once, arguing that if the country were once committed by a heavy expenditure it would be obliged to see the matter through. The latter gained the day and a splendid factory was put up at Maffra. There was everything to ensure a reasonable measure of success had there been a full supply of roots; but the whole thing fell through for want of raw material. The factory had a capacity of 400 tons of roots a day. To keep it going at only half its capacity for 100 days would have required 20,000 tons of roots. Nowhere would it be an easy thing in any circumstances to grow straight away 20,000 tons of roots, and even more difficult with growers who are not in thorough training to the work. The first year 1,554 acres were put in, but only 1,287 were harvested, and these yielded in a very bad season 9,109 tons of roots, being at the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DESIRABLE TYPES OF SUGAR BEET.
The topped beets indicate method of topping.
(From Bulletin issued by Colorado Experiment Station.)

rate of 7·08 tons to the acre. The second season was even worse than the first; 1,789 acres were put in, of which only 1,509 were harvested, and these yielded 6,271 tons, or only 4·15 tons to the acre. The factory had to be shut up, and the Government, which had advanced £62,000 towards the undertaking, foreclosed.* Such an outcome was due in the first place to the unfortunate coincidence of two exceptionally bad seasons with the institution of the factory, and also to an insufficient acquaintance on the part of growers with the requirements of the crop and the best methods of cultivation. Later trials amply demonstrated that no natural difficulties stood in the way of the successful establishment of the industry, and that the absence of organisation and exhaustive preliminary experiment were main factors in this regrettable issue.

In the entire process of sugar-making every by-product can be exploited, and it is chiefly due to this fact that beet-sugar can be produced at such a reasonable rate. Highly specialised machinery is, however, necessary, and a very large output essential to profitable running. A capacity of 300 tons of beet a day is probably an economic minimum in such a plant, and the original outlay involved will be at least £50,000. It will therefore be generally accorded that no useful purpose can be served by hurrying on an expenditure which can only be justified by convincing field results secured at a number of centres. With such data to hand it should be easily possible to secure a collective undertaking from growers to plant the minimum acreage necessary to keep such a factory working at its fullest capacity.

PROPOSED FIELD EXPERIMENTS.

In view of the general interest which has been expressed in the subject, no difficulty has been anticipated in securing the co-operation of farmers in the midland and up-country districts for the necessary preliminary investigations which should extend over a period of at least three years. Supplies of seed have been secured and assistance will be afforded to applicants in the preparation of experiment plots. These will be directed to the determination of the following questions:—The effect on the yield and quality of beet of (1) different manures and fertilizers; (2) autumn and spring ploughing; (3) different depths of ploughing and subsoiling; (4) different times of seeding; (5) amount of seed; (6) varieties of seed; (7) width of rows and spaces thinned in rows; (8) surface cultivation; (9) irrigation; (10) dates of harvesting; (11) varying soils and subsoils; (12) elevation.

In addition to the returns of acreage yields to be thus secured, provision has also been made for the subsequent analysis of the roots, for the value of the crop is principally determined by the sugar content.

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* *The Beet-sugar Industry in Victoria.*

which will vary within wide limits, and its purity. In this connection the fact is worthy of note that every per cent. of saline matter present in the roots prevents $3\frac{3}{4}$ per cent. of sugar from crystallizing, and that the amount of salts taken up by the crop varies very considerably within a small area. The importance of a number of centres of investigations thus becomes apparent, and it is further obvious that no results can be regarded as final until confirmed by chemical examination.

PRINCIPLES OF CULTIVATION.

The following statements given by farmers in Colorado who had at least four years of successful experience in sugar-beet cultivation are of universal interest, and may serve as a general guide to local planters*:—

1. The sugar beet crop is an expensive one to grow, and should be grown on the very best land on the farm.
2. One should not bring to the surface more than two inches of new soil in ploughing. Ground which has not been worked holds its plant food in a form not easily available to the plant. The young beet plant does not obtain proper nourishment from such soil and is checked in the beginning of its growth. When proper conditions prevail, beet ground should be ploughed at least 10 to 12 inches deep. When beet land is ploughed in the autumn, the soil is weathered, rendering plant food at surface easily available to young plants.
3. Beet ground should be as uniformily level as the lay of the land will permit.
4. Early planted beets have generally given the best yield. The seed bed should be warm, moist, but not wet, for the best germination.
5. A uniform stand is seldom obtained when seed is covered more than two inches deep. The vitality of the best seed does not seem to be sufficient to send the sprout out of the ground from greater depths.
6. Early thinning of beets has given the best results, since young plants recover from the effects of the thinning process without too serious a delay in plant growth. Do not seed more than five acres at a time, when it is possible to go over the entire field before the beets are too large for successful thinning.
7. Cultivation is for the purpose of keeping down weeds, to prevent baking of the surface and to give encouragement to continuous development of the beets.

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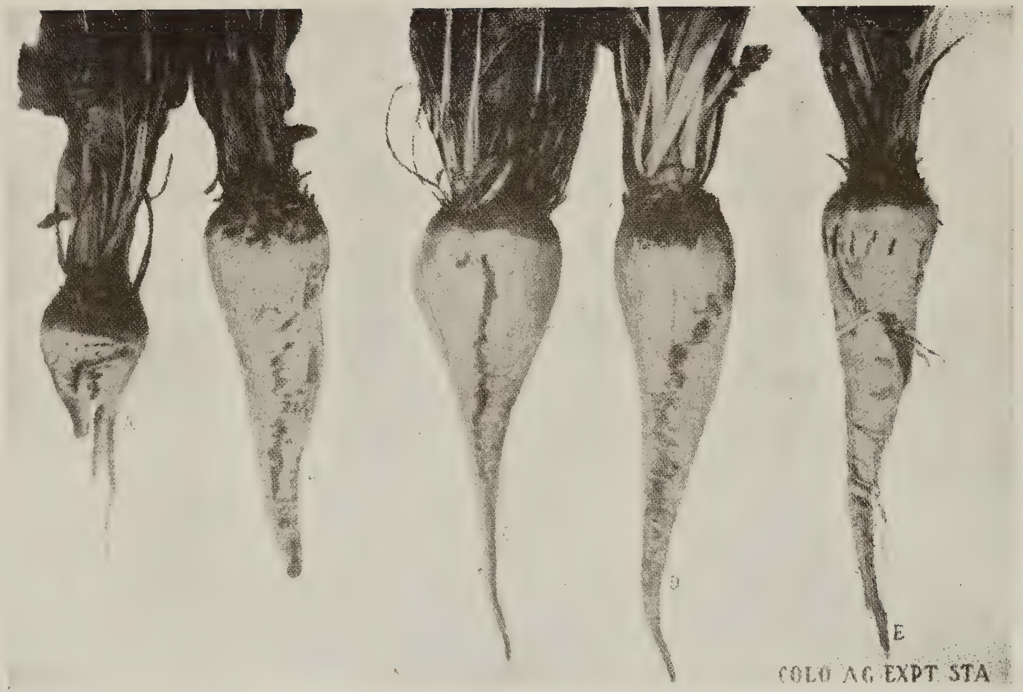
* Bull. 109. Colorado Expt. Stn.



VARYING TYPES OF SUGAR BEETS.

A—Burned off by stable manure unevenly distributed in row.
B—Spiral constrictions on beet.
C—Rapidly tapering beet—a loss in tonnage.
D—Irregular spiral depressions on beet.
E—Irregular growth of fibrous roots.

(From Bulletin issued by Colorado Experiment Station.)

8. The judicious use of water tends to produce well-shaped beets, increases the tonnage and gives a good sugar content, when proper sun and soil conditions prevail.
9. Beet farmers should plan for at least four weeks of the growing season after the last irrigation to mature the crop.
10. The growing of beets requires a crop rotation which shall maintain the humus and plant elements in the soil. A practical rotation of lucerne, potatoes, beets and grain is being gradually adopted.
11. The cultivation of sugar beets is improving farm methods in all crop production.

COST OF CULTIVATION AND VALUE OF CROP.

A comparison of statements recorded in different countries where sugar-beet has become a standard crop, serves to show that the costs of cultivation, including all charges, varies between £8 and £10 per acre, while the average yields secured range from ten to twenty-five tons per acre. The current factory price in Germany for roots showing a total sugar content of 14 per cent, and a degree of purity 88 per cent., which may for our purpose be taken as mean figures, is approximately 18s. a ton. Assuming costs to total £9 per acre, and allowance being made for the feeding value of tops and collars, it will be seen that while the lower yield leaves little or no margin of profit, a heavy crop, due to careful cultivation, may be the most profitable which the farmer can raise. And the indirect results of the thorough and deep tillage essential to such results are far-reaching. During the past 50 years Saxony has grown to be the finest agricultural province of Germany, and to serve as a model for the world, under the influence of sugar-beet production. Land which has been thoroughly worked to a depth of 14 inches, heavily manured, and carefully cleaned while under beet, can hardly fail to yield good returns to such other crops as are selected for the necessary rotation, and has in many parts of Europe almost doubled in market value.

(*To be continued.*)

In the United States, with the exception of one large concern in Boston, the entire rubber boot, shoe, and clothing industry of the United States is absorbed by one company, the United States Rubber Company. Rubber can be used up again; and in the United States alone nearly fifty million pounds annually consists of reclaimed material.

The Conservation of Soil Moisture.

"DRY FARMING" IN WESTERN U.S.A.

The term "dry farming" is a recent addition to agricultural literature; and as it meets a real need, it will probably find a permanent place there. The expression is ordinarily understood to mean farming in an arid or semi-arid region without irrigation, but this is often confusing, as "arid" is at best a relative expression and irrigation is often used even in humid regions. All good farming involves at least some tillage of the soil, which accomplishes several purposes at once. The soil is aerated, weeds are killed, the tilth is improved, and moisture is conserved. Sometimes one and sometimes another of these objects is the chief aim, and sometimes all are important. In dry farming, however, the one object of paramount importance is the conservation of soil moisture, and all the tillage operations are directed to this end.

During the past four or five years much interest has been manifested in the possibility of utilising for agricultural purposes some of the arable land in the western United States, where the rainfall is insufficient for ordinary farming. Within recent years, also, investigation and experimentation have been directed toward the solution of some of the complicated problems involved in the conservation of soil moisture in these arid regions. In a bulletin issued in March by the Bureau of Plant Industry of the U.S. Department of Agriculture, Mr. C. S. Scofield, Agriculturist in Charge of Western Agricultural Extension Investigations, describes the natural conditions and discusses the farming methods and crops for one of the sections (known as the "Great Basin") and the region in question where "dry farming" is now successfully carried on with an annual rainfall of 15 inches or slightly less. Some of the more important factors that have made this development possible are shown to be a distribution of the rainfall which is favourable as to season, a clean summer fallow between crops to conserve the rainfall of two seasons where necessary to produce a crop; and the maintenance of soil fertility by good tillage, together with the continued addition of organic matter to the soil. It is shown, also, that, while something has been done in the way of using drought-resisting crops, secured either through introductions from other countries or by plant breeding, much still remains to be done in this direction, and that further work along this line, together with still more knowledge as to the efficiency and cost of various tillage methods, promises to greatly extend the boundaries of profitable agriculture in the arid West.

In the decade of 1870-1880 some pioneer attempts were made to grow crops without irrigation in and around some of the valleys of the Great Basin. These attempts finally showed the way to the utilisation of large tracts of fertile land for which no irrigation water could be had. The first efforts were relatively few and unimportant, but as the country became more thickly settled and new irrigation enterprises became scarce and expensive, more attention was directed to the development of these non-irrigable lands.

This development was begun by sowing crops to supplement those grown on the irrigated land. Almost no attempts were made at first to establish farms on the dry lands, so that the first failures, by which the methods of success were learned, were not so disastrous as they might have been had it been necessary to build homes and make other improvements independent of any irrigation opportunities. "It is manifestly much easier," remarks Mr. Scofield, "to experiment in dry farming, to gamble on the weather as it were, if one has an irrigated farm to fall back upon in adverse seasons. Even where it is possible by the use of windmills or the development of springs or small streams to irrigate relatively small fields during a protracted drought, the settler is able to tide over times when without such a resource complete failure would be inevitable. When the utilisation of the dry lands can proceed from well-established agricultural centres, such as irrigated sections, instead of having to start unsupported in the midst of the dry lands, the risk of disastrous failure is greatly reduced."

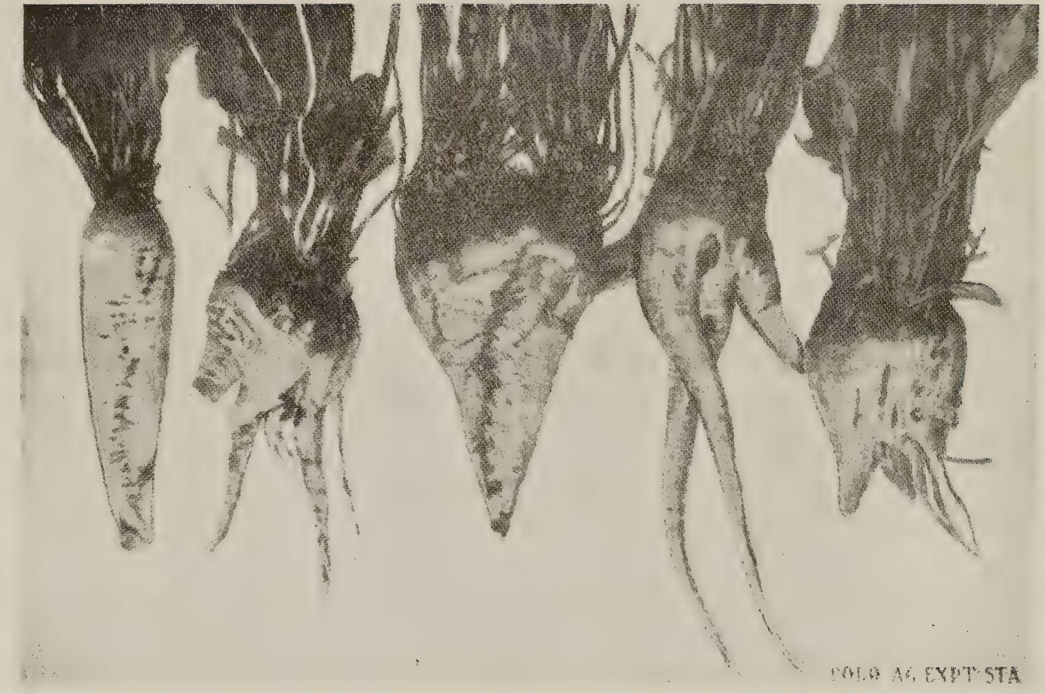
Wheat and lucerne are practically the only crops grown without irrigation in the Great Basin; and, of the two, wheat is by far the more extensively grown. Thin seeding is found essential to the best results with these crops. Other cereals, such as oats, barley, and rye, are grown in an experimental way; while maize, sorghum, potatoes, and field peas are also being tested to a limited extent.

Mr. Scofield points out that one of the most important effects of the development of dry farming adjacent to an irrigation settlement is the much-needed lesson it teaches of the value of tillage. Over-irrigation with little or no tillage is the most common and serious failing of the Western farmer. It is only where irrigation is costly or cannot be had at any price and when crops actually begin to fail that cultivation is seriously resorted to. As a result, it is only in those sections where irrigation is very new or where water is very scarce that the serious effects of over-irrigation are not felt. Once the habit is found, it is much easier to irrigate than to cultivate when a crop shows signs of distress. The ground is therefore filled with water, low places are swamped or made too alkaline for crops, and the fertility of the land is seriously impaired.

With the development of dry farming, however, the beneficial effects of tillage in conserving moisture and in increasing soil fertility give a constant and striking object lesson. When it becomes apparent that many of the same crops can be grown with adequate cultivation and without irrigation as successfully as they can be grown with irrigation alone, a farmer hesitates before undertaking to share the burden of expensive extensions to existing irrigation works. When the extension of a cultivated area is demanded, it becomes at once a practical question whether increased cultivation or increased construction shall be the basis of such extension. Whenever cultivation is resorted to in connection with irrigation, the benefits are at once apparent, but without some continued object lesson or some real need, such as scarcity of irrigation water, it is seldom seriously undertaken.

MOVEMENT OF CATTLE IN UPPER UMKOMANZI DIVISION.—With reference to Government Notice No. 338, 1907, under which the removal of cattle within the Magisterial Divisions of Ixopo and Richmond was prohibited, the Minister of Agriculture has notified that that portion of the Magisterial Division of Upper Umkomanzi bounded on the northwest by and including the farms Dripkloof and Stertrietfontein, and on the south-west by the Illovo River, has been excluded from the operation of Government Notice No. 338, 1907, this portion of the Upper Umkomanzi Division having already been included for the purposes of East Coast Fever Regulations in the Magisterial Division of Camperdown, under Government Notice No. 26, 1907.

FOOD VALUE OF SUGAR.—From various experiments which have been conducted, it is now known that a quick relief is given by sugar when an ordinary sense of fatigue is experienced. A writer in the *Louisiana Planter* points out that, although this property has seemed almost to require the title of sugar stimulation than that of sugar nutrition, any analysis of sugar shows that it is a carbohydrate food and of very definite value, and "apparently there is nothing mysterious about it." He adds that the quick assimilation and the resolution of the sugar into the blood, and the fact that it gives practically no residuary products of an injurious character, excepting the carbonic acid, which is so readily disposed of, renders it the quick-acting food that it is. The sense of fatigue that comes to tired men and tired animals is said to be owing to the presence of residuary products other than the carbonic acid, and the ease with which the carbonic acid may be expelled from the system. "If our planters would give more attention to the careful use of molasses as a food article for live stock," the writer remarks, "they would learn more and more of its merits the longer they use it."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UNDESIRABLE TYPES OF SUGAR BEET.
(From Bulletin issued by Colorado Experiment Station.)

The Brussels Sugar Convention.

By H. J. Choles.

The condition of things brought about in the sugar markets of the world by the Brussels Sugar Convention promises to be seriously disturbed by the action contemplated by Great Britain of withdrawing from the provisions of that Convention, of which she was a party, and through whose instrumentality the Convention was originally drawn up and signed. Early in June, Sir Edward Grey, the British Secretary of State for Foreign Affairs, announced that his Government considered "the limitations of the sources from which sugar may enter the United Kingdom, whether by prohibition or by imposition of the countervailing duties, as inconsistent with its declared policy and incompatible with the interests of British consumers and sugar manufacturers." This declaration was accompanied by the assurance that the British Government had "no desire to give sugar bounties or to see a revival of such bounties, or to differentiate against beet or foreign sugars." In effect, Great Britain declined to recognise, after the 1st September, 1908, the clauses of the Convention requiring it to penalise sugars declared by the Permanent Committee to be bounty-fed.

Natal cannot claim to be one of the countries of the world whose production of sugar has any more or less direct effect upon the world's markets; but this is by reason of our somewhat unique situation as regards markets. Were we isolated, a large overseas export would bring us into a much closer touch with the world's markets than we at present enjoy. Under existing circumstances, however, practically all our sugar, etc., is consumed in South Africa, the Transvaal taking (in 1906) as much as 62 per cent. of our production. The following statement, prepared from the Annual Blue Book of the South African Customs Statistical Bureau, shows the distribution of our exports:—

Exports of Natal Sugar, etc., 1906.

Sugar:—	£
Cape Colony	92,865
Orange River Colony	55,804
Transvaal	248,937
South Rhodesia	109
Basutoland	502
Bechuanaland	1,199
Portuguese East Africa	524
	£399,940

Sugar Products:—	£
Cape Colony	1,702
Orange River Colony	529
Transvaal	2,152
Portuguese East Africa	46
	£4,429
Total Value of Exports	£404,369

Our imports of sugar (exclusive of sugar products) in the same year amounted in value to £68,312 (£405 worth of this amount being removed into Natal from other States in the S.A. Customs Union), of which £58,418 worth was entered for consumption in Natal. The principal countries from which this sugar came were—

Mauritius, contributing	£57,096	worth;
United Kingdom, contributing	£3,209	,,
New South Wales, contributing	£1,733	,,
Victoria, contributing	£1,614	,,
U.S.A., contributing	£1,144	,,
Germany, contributing	£1,047	,,
Dutch E. Indies, contributing	£803	,,
Other Countries, contributing	£1,261	,,
Making a total from oversea of	£67,907	

The imports of sugar into British South Africa as a whole in 1906 are shown in the following statement:—

	£
Via Cape Colony	460,651
,, Natal	67,907
,, Delagoa Bay	78,393
,, Beira	6,736
	£613,687

From these statements will be seen the dimensions of the sugar trade of South Africa; the importance of our own production will also be evident; and the ratio of the effect upon the South African sugar market of any disturbing influence upon the world's market will in some measure be appreciated. Finally, the importance of a careful study of the whole international situation will be evident; and for that purpose it is the present writer's intention to endeavour to present readers of the *Journal* with as clear an idea as possible of the international situation as regards sugar.

The present state of affairs has been brought about primarily by the rapid increase in the output of European beet sugar. The earliest production of beet sugar in Europe on a commercial scale took place in France during the Napoleonic wars. At the time France obtained the bulk of her sugar requirements from her Colonies in the West Indies. The continental blockade and other commercial restrictions growing out of the war with England, however, suddenly put a stop to direct Colonial trade; and this interruption in the supply of Colonial sugar naturally gave a great impetus to the culture of beets, which, for some time previous, had been recognised as a possible source of sugar.

France was for some years the principal producer of beet sugar; but Germany, entering the field some little while after the middle of the nineteenth century, rapidly developed in that direction. The production of France is now surpassed, not only by Germany, but by Russia and Austria-Hungary as well.

The course of development of beet sugar production in Europe was influenced largely by direct and indirect State interference. Competition from foreign sugars was prevented in the various interested European States by fixing the rate of duty on imported sugar higher than the excise on the imported product. This excise was levied solely for revenual purposes; and it determined the minimum price of sugar for domestic consumption, while the protective import duty fixed the maximum to which prices could be carried without incurring foreign competition.

The production of beet sugar increasing much more rapidly than the domestic consumption, it became necessary to seek for a market abroad. This was accomplished either by exempting from excise the sugar intended for exportation or by refunding, in the form of a drawback, the excise on all sugar exported. This latter method was the one first adopted. The drawback was frequently paid on a basis that, intentionally or otherwise, more than compensated for the excise originally paid, and thus carried a concealed export bounty. The indefinite amount of the hidden bounty, however, proved unsatisfactory, and the system was changed by all the more important countries except Belgium. In Russia the amount of the drawback was limited to the excise actually paid; France, Germany, Austria-Hungary, and the Netherlands abolished drawbacks and exempted from excise sugar destined for export. In place of the encouragement to exports provided by the rebate system, Germany, Austria-Hungary, and the Netherlands next granted direct bounties, while Russia and France gave privileges that were equivalent to indirect bounties. France in 1897 also granted a small direct bounty on sugar exported.

The most obvious effects of such legislation prior to the Brussels Convention were undoubtedly the artificially high prices obtaining in the countries of production and the artificially low prices prevailing in foreign markets. For example, the average price of refined sugar during the year ended 31st August, 1903, was less than 2d. per ℔. in the

United Kingdom, and only 2¼d. per ℔. in the United States; whilst the price in the Continental sugar-producing countries varied from 3⅛d. per ℔. in Germany to over 4d. per ℔. in France. Yet at the same time that the German consumer of sugar was thus paying over 3d. per ℔., German refined sugar when shipped abroad brought the exporter only 1d. per ℔.

To put an end to such "unnatural" prices for sugar, and to bring about a set of conditions which would result in "natural" prices on the world's markets, is, in substance, the object of the Brussels Sugar Convention. A brief historical retrospect will enable the reader to more intelligently appreciate the principles of the present Convention.

It was in 1864 that Mr. Gladstone first proposed to take international steps for the abolition of the existing bounties on the exportation of refined sugar from the producing States of Europe; and in that year a Convention was signed with that object—a Convention that he characterised as "a beneficial arrangement, beneficial alike to importers, refiners, and consumers." For ten years this treaty continued, and during that time France managed to evade her engagements, in spite of constant protests from the British Government. The bounty obtained by the Paris refiners went on steadily increasing, and by the close of the Franco-German War had jumped to a formidable sum. The bounty at this time was confined to refined sugar, and arose from the fact that the duty was paid on the raw sugar as it entered the refinery according to an estimated yield of refined sugar, the full duty on pure sugar being returned as a rebate on that portion of the refined sugar which was exported. The method of estimating the yield was imperfect and incorrect, and also gave opportunities for fraud and deception. The result was that a much larger sum was returned in drawback than had been paid in duty.

In 1872, two years before the expiry of the Convention, the struggle began. The British refiners pointed out that the only effectual remedy would be to levy no duty until the refined sugar went into consumption. By that means the refined sugar which went for export, having paid no duty would receive no drawback, and therefore no bounty. The British Government was at last convinced that this was the only remedy, and urged its international adoption. After a struggle, lasting through three years, between the British refiners and French beetroot sugar manufacturers (who were keenly alive to the fact that the bounty was preventing them from finding an excellent customer in the British refiner) on the one hand and the Paris refiners on the other, a Conference, in 1875, was at last held at Brussels, at which Great Britain, France, Belgium, and Holland were represented. After many evasions and delays a Convention was drafted in 1877, but it contained a Penal Clause to which the British Government would not agree. The French delegates, supported by Belgium and Holland, pointed out most reasonably that they could not bind themselves to establish bounties unless they had security, in the terms of the Convention, that they should no longer be liable to the competition from other quarters. This security was refused by Britain. In the meantime Germany and Austria were beginning to give bounties. The intention was excellent enough; for the system was intended as a direct encouragement to the growth of the richest roots and to the perfecting of the machinery and processes for the extraction of the largest possible portion of the sugar contained in them.

By this time the West Indies had awoken to the menace the existing state of things offered to their local cane sugar industry. They saw that every ton of foreign bounty-fed refined sugar imported meant a ton of their own raw sugar excluded from the British markets. They therefore joined the British refiners in fighting the European bounty system.

In 1879 a Select Committee of the House of Commons went into the question, and thoroughly sifted all the details. The whole question gradually resolved itself into this: Is a duty to countervail a bounty consistent with free trade? The Committee reported that it was, and, we are told, gave conclusive reasons for its decision. The Foreign Office, however, declared that it would be contrary to the stipulations of the most-favoured-nation Clause in Britain's Commercial Treaties, and the decision of the Committee consequently became of no effect.

Mr. Gladstone, on again being in power, took the conduct of negotiations away from the Foreign Office and handed it over to the Board of Trade. That Department was, however, at the time hostile to the abolition of bounties, and the question was allowed to remain in abeyance, whilst in the meantime the bounties went on increasing to an enormous extent.

In 1889 a Convention was signed in London; but upon a small and unreasonable opposition being offered to the Bill in the House of Commons, it was withdrawn. Ten years of inaction ensued; whilst the production of bounty-fed sugar constituted two-thirds of the world's visible supply, cane sugar rapidly disappearing from British markets and British refined sugar being displaced by an annual importation of nearly a million tons of bounty-fed foreign refined.

In 1898 another futile attempt was made at a settlement of the question. However, at the Congress of the Chambers of Commerce of the Empire, held in London in 1900, a resolution was carried by a large majority in favour of a Convention with a Penal Clause; and the Government accepted this as a mandate.

In the meantime a new form of bounty, far more dangerous and excessive than any of its predecessors, had made its appearance. In 1895 the Russian Government adopted an elaborate system whereby the manufacturers were enabled to maintain the price of sugar for home consumption, by means of a high protective import duty, at a figure far in excess of the world's price. They consequently secured an enormous extra profit, and were able to sell for export at a figure even below cost price and yet make an abnormal profit on their total production. The effect of such a "dumping" system upon the markets of the world can be imagined. Germany and Austria followed the example. The German and Austrian "Cartels," however, though resulting in a bounty, were on somewhat different lines from the Russian system, in that they were private combinations of the beet sugar manufacturers and refiners and not a combination recognised by the State. These cartels, however, depended for their success on the action of the State in maintaining a high import duty, and the advantage derived consequently constituted a State bounty.

In March, 1902, then, at the eighth European Sugar Bounty Conference since that of Paris in 1862, an understanding was arrived at, and a Convention duly signed at Brussels.

By the first article of the Convention, the High Contracting Parties agreed, from the date of the putting in force of the Convention, to suppress the direct and indirect bounties which might benefit the production or export of sugar, and not to establish bounties of this kind during the duration of the Convention. The agreement applies to confectionery, chocolate, and all analogous products containing sugar artificially incorporated in notable proportions; and to all advantages, resulting directly or indirectly for producers, from fiscal legislation, including: (*a*) Direct bounties granted to exports; (*b*) and to production; (*c*) total or partial exemption from taxation as to any part of the output; (*d*) advantages derived from excess of yield; (*e*) and from the exaggeration of drawback; (*f*) and from any surtax in excess of the rate fixed by Article 3.

Under Article 2 sugar factories and refineries of all kinds are placed in bond, and worked under the continuous supervision of revenue officers; and finished sugars are stored in bonded warehouses.

Article 3 limits the surtax to a minimum of 2s. 5¼d. per cwt. or £2 8s. 9d. per ton for refined and assimilable sugars; and of 2s. 2·8d. per cwt., or £2 4s. 8½d. per ton for other sugars. The surtax, it may be mentioned, is the difference between the rate of duty imposed on foreign sugar and the rate of duty, or tax, imposed on the home product. The provisions of this article do not apply to import duties on sugar imposed by countries that do not produce sugar, nor to the by-products of sugar manufacture or of refinery.

Article 4 provides for the imposition, by the High Contracting Parties, of a special duty on the importation into their respective territories of sugars from countries that grant bounties either on production or export. This duty may not be less than the amount of the bounties, direct or indirect, granted in the country of origin. Furthermore, each of the parties has the right to prohibit the importation of bounty-fed sugars.

By the provisions of Article 5 the High Contracting Parties agree to admit, at the lowest rate of import duty sugars of any of the contracting countries, or of any Colonies or Possessions belonging to them that do not grant bounties, and to which the obligations imposed by Article 8 do not apply.

Under Article 8 the Parties agree, for themselves, their Colonies and Possessions—an exception being made for the self-governing Colonies of Great Britain and the British East Indies—to prevent bounty-fed sugar, which has traversed territories of a Contracting State, from enjoying the advantages of the Convention in the market of destination.

The provisions of the Convention apply, by Article 11, to the over-sea Colonies and Possessions of the parties, those of the Netherlands and Great Britain excepted, save as regards the provisions of Articles 5 and 8.

The Colonial attitude towards the Brussels Convention is certainly one of strong protest against any withdrawal on the part of Great Britain, or any step that is likely to upset existing things. Petitions have already been sent to the British Government on behalf of the commercial communities in Trinidad and Barbados, earnestly deprecating any change, we learn from the *International Sugar Journal*; and now certain Indian Chambers of Commerce are joining in the protest. The Karachi Chamber has declared that the "continuation of Convention would be in the interests of the sugar trade generally and the trade with India in particular, as the countervailing duties are a distinct advantage to free working." This Chamber resolved that the Chambers of Bengal, Bombay, Madras, Upper India and the Punjab be informed accordingly and asked to make a joint representation to His Majesty's Ministers through the Indian Government. Already, it is stated, the uncertainty which prevails is debarring capitalists from going on with schemes. The Central Factory at Antigua was the outcome of the signing of the Brussels Convention, and an important scheme for a similar factory in St. Kitts has had to be abandoned till more auspicious times. What Queenslanders think about the matter is not known at the time of writing; but they are placed in a worse position than we are, on account of the policy of their Government in permitting the employment of white labour only; and it is highly probable that Australians will feel the effect of any change as soon as anyone.

What the precise effects of England's proposed action will be it is not altogether easy to foresee. The immediate result, however, according to some of the Continental and other sugar journals, will be the cessation of the Convention in its present form. Whether a new one will be entered into by the remaining parties of the existing Convention, to the exclusion of England, or whether each sugar-producing country will elaborate its own means of protection for its sugar industry, cannot yet be foretold. The disruption of the present Convention, however, will open the door to any Power who likes to return to the ante-Convention system of bounties; and such a system, when once started, will, as past history has shown, rapidly increase, tending more and more to an over-production of sugar and consequent glut of the sugar market. Following that will come the retirement of smaller countries whose sugar is produced without the aid of bounties, the competition of bounty-fed sugar making it impossible to sell at a profit. The result will be a monopoly for the country or countries that enjoy most State assistance in the form of bounties.

In some quarters it is said that Germany and other countries that gave bounties in pre-Convention days will not return to the old system of artificial stimulus to production; that those countries do not desire to see the revival of bounties any more than we do. However that may be, the fact remains that Russia and Argentine, both of which remained out of the Brussels Convention, still see fit to give bounties, having apparently not yet realised that they are suffering any disadvantages from the practice! At all events, the cessation of the Convention will remove the means that has kept the sugar market in a state of equilibrium and allowed prices to adjust themselves to a "natural" level; and the barrier that has prevented the Contracting Powers from returning to the old conditions and thereby upsetting the market and forcing down prices to a level ruinous to "natural" producers.

Another result of the denunciation of the Convention will be that the bounty-fed sugars of Russia and Argentina will be admitted into England, in competition with West Indian and other Colonial sugars, and the ruling prices of sugar in the United Kingdom will consequently be very low.

We in Natal are fortunate in having close at hand a large market for our sugar, wherein we can successfully compete with the overseas product so long as "natural" prices are ruling in the world's markets; but should the present equilibrium maintained by the Convention be disturbed in such a way as to give bounty-fed sugar the upper hand in the market, the result would inevitably be—subject, of course, to the voluntary abolition of all State and Cartel bounties—an unnatural depression of prices, which would enable beet sugar to undersell us in our own markets, resulting either in the enforcement of strong protective duties for South Africa or the eventual strangling of our local industry.

A secondary consequence so far as South Africa is concerned—though, as will be seen, an important one—will be this: that the cheapness of sugar on the London markets will mean a great boom in the British jam-manufacturing and export trade. Under already existing circumstances we are engaged in a severe enough fight against foreign jams, but the reduction of a penny per tin in imported jams would probably seriously throw back our local industry.

In addition, we should, of course, be open to competition from overseas sugar to a much greater degree than we are at present; but a remedy could well be provided in the form of a high protective import duty.

South Africa can, by combined action, fight foreign sugar, no matter to what extent the production of that sugar has been assisted by bounties. Many useful lessons are to be learned from the history of the formation of the Brusels Convention; and, if it comes to the worst, we can adopt the Convention principle of either totally excluding bounty-fed sugar or imposing an import duty equivalent to the amount of the original bounty.

Nevertheless, the cessation of the Convention will have effects, both direct and indirect, on the sugar markets of the world, the anticipation of which will warrant a close study of the situation, and a close watch of the trend of events.

This article has been hastily written to secure its insertion in the August issue of the *Journal*; and the writer therefore craves the indulgence of his readers for its many imperfections, and also if he has, as undoubtedly he has done, failed to bring out many arguments that militate against the withdrawal from the Convention and a possibly consequent reversion to the evil bounty conditions existing before the forming of the Convention.

The writer wishes to express his acknowledgments to such authorities as Mr. G. Martineau in the *Economic Journal* (March, 1904); Mr. Frank R. Rutter, Assistant Chief of the Division of Foreign Markets of the U.S. Bureau of Statistics, in his interesting bulletin on the "International Sugar Situation," issued in 1904; Mr. E. Castelot, in the *Economic Journal* of March, 1905; and to articles in various current periodicals.

BURBANK'S "PLUMCOT."—Mr. Luther Burbank, whose exploits as an experimentalist in plant breeding are universally known, has recently added a new achievement to his already long list. This is a cross between the plum and the apricot, to which the name of "plumcot" has been aptly given. In a single fruit the experimenter has combined enough of the diverse characteristics of the two fruits to enable the ordinary observer to recognise the combination and distinguish each contributor to the hybrid. One of the most striking features of the new fruit is said to be its brilliant red flesh, which is possessed of a strong sub-acid flavour rendering it a favourite for cooking, jellies and jams. When fully ripe it is stated to be an excellent dessert fruit, possessing a delightful apricot-plum flavour. The fruit is about the size of an ordinary apricot, with a deep purple velvet skin.

Ostrich Farming in Cape Colony.

THE Department of Agriculture has been favoured by the Director of Agriculture, Cape Colony, with the following precis of reports recently framed by officers of the Cape Department after consulting some of the leading ostrich farmers in that Colony:—

In the districts of Oudtshoorn, George and Mossel Bay a farm provided with lucerne will carry from 6 to 14 birds per morgen per year in an average season, the number varying with the quality of the soil and the amount of water obtainable. As ostriches only eat the leaves and top shoots of lucerne, other stock (cattle, horses, mules), which consume the stalks, are usually run with them at the rate of about two per morgen.

An ordinary Karroo farm will carry an average of one bird to 20 morgen. This system of ostrich farming is not favoured by the best breeders in the South-Western districts, as the birds are wild and untractable and the quality of feathers very indifferent compared with those produced on lucerne lands.

A pair of good breeding birds will hatch out three lots of chickens in a year and will produce on an average 10 to 12 chicks at each sitting, but these are by no means common. An ordinary pair of breeding ostriches will not produce chicks more than twice a year, and, as many eggs and young chicks are destroyed by carelessness and accidents, the number of young birds reared to three months old from an average pair of breeders is not more than 18 to 20 per year. The usual price of chicks is from £1 10s. to £2, according to quality, but for chicks from first-class birds to £10 each or more is easily obtained.

The average production of the value of feathers per year is difficult to estimate as the feathers of different birds vary in value from 7s. 6d. in moderate chickens to £10 or higher in first-class cock birds, but the average annual value of the feathers per bird in the district of Oudtshoorn may be placed at £4, and at £3 in the rest of this area where ostrich farming is carried on. The quantities and prices of feathers are variable from climatic conditions and the fluctuation of the market, but the statements given above represent the condition of affairs at the present time as fairly as possible.

In the district of Beaufort West there are no farms of which the Government is aware provided at present with sufficient lucerne to run birds on.

So far as can be gauged by reckoning as accurately as possible the morgenage of several of the best camps, it is considered that about seven morgen to the bird is about the average on good veld, but information tends to show that, generally speaking, this is too little to allow, and perhaps ten morgen would be more like the average.

Very few (if any) tame birds are at present being bred in this district, all farmers catching the wild chicks on the veld. The average number of eggs in a wild nest is about twenty, though twenty-seven have been seen, but it has been stated that the birds invariably throw any eggs more than eighteen or twenty out of the nest before they commence to sit. A tame or regularly plucked bird would probably not cover more than twelve eggs.

Birds in this as in other districts are plucked every nine months; the average pluck from a veld-fed bird yielding from £2 to £2 10s., which would work out at about £2 10s. to £3 2s. per annum. At one time there was a very considerable business done in catching wild chicks and selling them to Oudtshoorn farmers, and to a less extent this is still carried on; chicks about six weeks old generally fetch £1 per chick. Some time ago Mr. Fourie stated that he was confident that birds caught on the veld and run on lucerne lands would yield, after the first pluck, not less than £5 per pluck.

In the districts of Somerset East, Cradock and Middelburg, lucerne, provided it is grown on good soil and under irrigation the whole year, can carry 10 birds per morgen producing feathers worth £7 10s. per bird. If the lucerne is under flood water only then it will carry six birds per morgen, but other veld must also be available with feather production of £6 per bird.

On ordinary Karroo farms 100 morgen can carry 7 to 10 birds returning feathers at £3 per head.

From each pair of breeding birds 20 to 30 chicks may be reared valued at 30s. to £2 per head when a year old. It should be added that the ostriches must be good average birds to give the above results.

Mr. Leonard Acutt has left Natal on a visit to Mauritius for the purpose of studying the fibre and sugar-cane industries of that island. The expenses of his trip are being paid by joint Government and private contributions.

Considerable interest attaches to a wonderful "strike" of water in the Cape Colony, at Murraysburg, says the *Bloemfontein Post*. The Town Council of that place had an 8-inch bore hole put down which tapped at a depth of 75 feet, a supply which could be pumped out at the rate of a quarter of a million gallons per 24 hours.

Notice to Manure Merchants.

ALL manure manufacturers, agents and vendors are respectfully requested to submit their manures of the present season for sampling, analysis and valuation by the Agricultural Department in order that they may be included in the 1907 Manure Bulletin now in course of preparation.

Samples will be dealt with as far as possible in the order in which they are advised, and will afterwards appear in the *Agricultural Journal* as their analysis is completed.

Notice of the arrival or availability of manures for this purpose should be addressed to the Analyst, Central Experiment Farm, Cedara, as soon as possible.

Vlei Soils.

(Continued.)

By ALEX. PARDY, F.C.S., Analyst.

BEFORE considering the mechanical nature of these soils, it may be as well to describe their general appearance and origin.

The first foot of No. 1 was of a dark brown or chocolate colour. It was of a free coarse nature containing about one-fourth of its weight of rounded nodules of ironstone. The third foot was of a red colour, due to the presence of decomposed ironstone: it contained about half its weight of ironstone nodules. The second foot was intermediate between these two.

The first foot of No. 2 consisted of a dark brown free soil. The third foot extended into the purple (Beaufort?) shale formation; whilst the second foot contained portions resembling both the soil and the shale.

In No. 3 the first foot was represented by a rather harsh, grey-looking soil, which at three feet deep was underlayed by a yellow clay, the second foot showing characteristics of both.

No. 4 consisted of the surface foot of a washed down soil of a dark brown colour and gravelly nature.

In No. 7 the first foot was a dark brown sandy clay overlying a stiff subsoil.

All the above samples were obtained from the low-lying lands forming part of the Experimental Farm at Cedara.

In No. 6 the surface portion was a free soil of a dark brown colour lying on a red, somewhat stiff-looking clay subsoil.

In No. 7 the first foot was a dark brown sandy clay overlying a stiff red soil.

These latter samples were obtained from the Irrigation Settlement at Weenen.

Air-dried samples were used in each case for the carrying out of the following experiments, which were undertaken for the purpose of ascertaining some information regarding the mechanical and physical properties of these soils. Under the ordinary conditions of drying and ignition they were found to contain:

		1st Foot.	2nd Foot.	3rd Foot.
No. 1	Moisture ...	6·94	7·56	7·23
	Organic matter (loss on ignition)	11·23	9·22	7·37
No 2	Moisture ...	8·30	7·90	4·72
	Organic matter ...	13·46	10·40	8·17
No. 3	Moisture ...	6·62	5·40	4·91
	Organic matter ...	13·52	9·91	7·66
No. 4	Moisture ...	6·22	...	...
	Organic matter ...	15·71	...	...
No. 5	Moisture ...	5·39	9·37	...
	Organic matter ...	10·97	11·96	...
No. 6	Moisture ...	2·06	5·07	...
	Organic matter...	2·88	3·92	...
No. 7	Moisture ...	1·99	5·48	...
	Organic matter ...	2·38	5·76	...

These figures show that there are very great differences between the groups and individual soils in respect to their contents of organic matter and capabilities to hold water under the drying effects of the atmosphere when all sources of moisture are cut off. It is doubtful if much or any of the water thus so firmly held would be available to plants, but as there is a very material effect produced in soils by their organic matter, in the direction of absorbing and attracting moisture from the atmosphere and ground water, it is indicative of their relative capabilities under natural conditions to hold a supply which will be available to plants. To obtain further information in this direction it is necessary to consult the mechanical nature as well as the physical properties of the soil.

A direct experiment was undertaken in order to ascertain the relative powers of the various soils to hold water under saturated conditions, or the utmost capacity they were capable of exerting towards the retention of water. Water was added, in this experiment, to a known quantity of soil until it had absorbed as much as it was capable of holding and the excess began to drain away. It was found in this respect that these soils had various capacities, as will be seen by the following table, in which are given the parts by weight of water retained:—

CAPACITY TO HOLD WATER.

No.	(1)	(2)	(3)
I.	42	46	27
II.	44	40	34
III.	45	40	63
IV.	45	..	..
V.	61	50	..
VI.	40	57	..
VII.	46	50	..

It will be seen from these results that this property is not proportionate to the amount of organic matter present, although it is apparently much modified thereby; and, although dependent thereon to some extent, it appears to be more directly influenced by the mechanical condition, as will be seen from the table given hereafter. In the third foot of No. 3, for instance, where 63 is the measure of its capacity, the finer particles predominate. It is only moderately supplied with organic matter, but on the other hand the silt and clay portions are relatively higher, they, when taken collectively, representing over half the weight of the soil. In the third foot of No. 1, where 27 is given as a measure of its saturated condition, the coarser particles predominate, while the organic matter is in similar proportion. Further comparisons may be made from the following table in which the soil is divided proportionately into groups of various sized particles:—

MECHANICAL DIVISION AND CAPILLARY ATTRACTION FOR WATER.

Sample.		Stones.	Fine Soil.							Capillary Attraction for Water.		
			Gravel.	Coarse Sand.	Fine Sand.	Silt.	Fine Silt.	Clay.	Humus.	12 hours.	24 hours.	36 hours.
I. ...	1st foot ...	22·75	8·38	6·76	28·36	22·22	6·61	6·12	2·68	12	13·8	16·9
	2nd ,, ...	32·21	11·48	4·48	27·71	21·35	10·59	5·37	2·96	12	13·7	16·4
	3rd ,, ...	59·05	19·30	4·46	32·24	16·36	7·64	4·34	1·71	4·5	5	6·1
II. ...	1st ,, ...	10·32	3·79	1·59	23·17	30·41	8·66	8·25	5·30	6	7·2	9·7
	2nd ,, ...	29·08	6·88	2·26	19·16	21·58	20·47	12·25	5·00	10·9	11·2	13·4
	3rd ,, ...	43·87	17·42	11·63	20·87	17·00	11·78	5·85	1.16	5·1	5·9	6·9
III. ...	1st ,, ...	0·11	0·21	2·13	28·34	23·09	9·76	13·32	6·51	8	9	10·9
	2nd ,, ...	0	0·25	2·70	31·24	24·43	14·09	11·21	3·14	5·4	6·4	8·0
	3rd ,, ...	0	0·30	1·45	28·82	17·90	22·39	13·99	3·71	4	5·5	6·75
IV. ...	1st ,, ...	9·96	0·58	0·94	29·82	26·00	11·39	7·75	5·75	7·5	8·4	9·2
V. ...	1st ,, ...	0	0·18	2·02	28·78	19·02	19·93	11·74	4·77	2·2	3·2	3·5
	2nd ,, ...	0	0·17	1.41	19·20	15·25	14·87	26·17	7·78	4	5·2	5·5
VI. ...	1st ,, ...	1·33	1·33	45·03	27·33	5·75	9·00	3·75	1·42	9·5	10·8	11.5
	2nd ,, ...	0·89	0·89	34·38	19·17	12·21	15·37	4·93	1·31	2·5	4·7	6·0
VII. ...	1st ,, ...	2·41	2·41	50·41	18·40	4·18	7·39	8·47	1·93	5·5	6	6·5
	2nd ,, ...	1·06	1·06	34·49	17·81	13·17	13·03	5·71	1·21	4·5	5·0	6·7

The size and distribution of the particles have much to do with fertility, both in respect to their influence on the soil's atmosphere and moisture conditions and the availability of its plant food material. Generally speaking, a soil which contains an abundant supply of the finer portions is likely to be a more productive soil than one in which the coarser particles predominate.

Under capillary attraction for water are given the heights to which water rose through the soils within given periods of time. This is a very important feature with regard to soils, particularly so in dry weather when the only source of moisture is that which lies deep down in the underlying layers. By capillary attraction such water is capable of rising in varying degrees of quantity and speed to the dry surface layers in which the plant roots may be situated. This rise of water is governed mainly by the size and distribution of the soil particles. A coarse sandy soil or a compact clay may each have a deterrent effect on the upward passage of water through the soil, the one because of the size of the grain and the other on account of its compactness. The Campbell system of dry land culture provides for this latter contingency by first breaking up the underlying soil so as to make it more permeable and then compacting it sufficiently to induce a greater capillary rise of water.

THE FARMER AND PROFITS.—In the course of his speech at the opening of the second National Poultry Conference held in England in July, Sir Thomas Elliot, of the Board of Agriculture, said he was convinced in regard to the poultry industry, as in regard to the whole agricultural industry, that there were three important things to be kept in mind. First of all, they were bound, if they wanted to succeed, to improve the quality of their produce. People might just as well, for themselves, produce articles of good quality rather than of bad quality. The difference in price was enormous, while the actual difference in the cost of production was comparatively small. Therefore, anything that could be done by the Conference, or at any other times, to induce British agriculturists to improve the quality of their produce, would be of great benefit to the industry. Then they should do all they could to prevent the preventable losses which occurred in the industry. Anything which tended to minimise the amount of disease or which tended to give the producer the full value and benefit of his produce, was also so much to the good. And then they must induce the farmer not to despise the small supplementary profits which may make all the difference between profit and loss, when the year's accounts are made up.

Oat and Barley Smut.

From 1898 to 1903 extensive tests were made by the Agricultural Experiment Station, Wisconsin, to determine the loss experienced by Wisconsin farmers from oat smut and the most effective remedy to be used for its eradication. From the tests made it was found that no less than 20 per cent. of the oats grown in the State were lost through smut, representing a money value of about £900,000 annually. As a result of these experiments, it is claimed that "the remedy is so simple, cheap, and effective that there is no excuse for the Wisconsin farmers allowing the oat smut to take possession of their fields. All seed oats for next year's sowing, unless known positively to be smut-free, should be treated for ten minutes in a formaldehyde solution." It is stated that this oat smut remedy was so generally adopted that, in 1904, the oats throughout the State, with few exceptions, were smut-free, or nearly so. Experiments were also conducted in connection with barley smut. Two varieties of smut were found to affect barley, known respectively as "closed" and "loose" smut. The closed smut is eradicated by the formaldehyde method of seed treatment, but the loose smut is not. An experiment was accordingly started at the Station in the spring of 1906 with the hope of finding some treatment that would be effective for both varieties of barley smut. The treatment which proved successful was that familiarly known as the "Jensen" Hot Water treatment (discovered by Professor C. F. Jensen, of Denmark, in 1888, and further tested and modified by W. F. Swingle, U.S. Department of Agriculture, in 1898). The treatment used at the Wisconsin Station was a modification of the Swingle method. The barley was placed in gunny sacks and submerged for twelve hours in cold water for the purpose of softening the hull and berry; it was then pulled from the cask and left one hour to drain. The sacks of barley were then submerged in a cask containing hot water, held at a constant temperature of 130 deg. F. for varying lengths of time: a ten minutes' submergence was found to be of sufficient duration without danger of destruction of seed. By having boiling water in a kettle or tank near at hand, some can be added to that in the cask in which the barley is submerged, as the temperature will be somewhat lowered after the sack of grain is put in. The sack of barley should be first put into a barrel of water having a temperature slightly lower than 130 deg. F., in order to warm before being submerged in the water which is kept constantly at 130 deg. F. Seed barley, it is advised, should be sown on the same, or not later than the day following treatment; otherwise it will sprout, and difficulty will accordingly be experienced in getting it to run through the seeder or drill.

Wood and Bark.

By F. C. Fernando, Forester.

(*Continued from page 349.*)

3. The Secondary Tissues.—With the differentiation of the primary tissues, growth in length, or elongation, ceases permanently at that point of the stem or shoot. Any subsequent increase in size is caused by growth in girth or lateral development.

In the tree ferns, cycads (*e.g.*, the kaffir bread—*Encephalartos*), and nearly all monocotyledons, such as the grasses and palms, the stem attains its final development, with the more or less lignification of the primary tissues. Such stems therefore maintain through life the girth dimensions attained at the maturity of the primary tissues.

We should bear in mind that the rigid immobility essential to the stability of a building is not required in a plant. In the classes of plants just quoted, the crown carried by the stems are as a rule branchless, comparatively light, or confined to a whorl of leaves situated at the summit of the stem. It is reasonable therefore to infer that the mechanical equipment of the stem furnished by the primary tissues is adequate to meet all requirements for the stability of the plant body.

On the other hand, in the conifers, and such dicotyledons or broad-leaved species as attain to shrub or tree size, we have a different set of conditions. The crown in every such case is comparatively heavy, and composed of an ascending series of leafy branches distributed tier above tier, and clothing a large proportion of the stem. The weight of such an elaborate superstructure, combined with the additional bending strain exerted on the stem by the resistence afforded by such a mass to wind, must make a greater demand upon the strength of the stem than in the previous case; and it therefore becomes necessary that the primary tissues be augmented by additional tissues to enable the stem to successfully withstand the additional strain put upon it. Such tissues laid on subsequently, increasing the strength, and elaborating the structure of the stem, are termed the Secondary Tissues.

Secondary tissues take the form of complete superimposed zones of tissue deposited between the wood and bast strands of the primary tissues. While on one hand every successive zone or instalment of secondary tissues corresponds with the further elongation of the terminal and lateral shoots of the tree, and therefore with an advance in its age, its effect on the other hand is to increase the girth of the stem. The stems of such trees therefore continue to increase in girth from year to

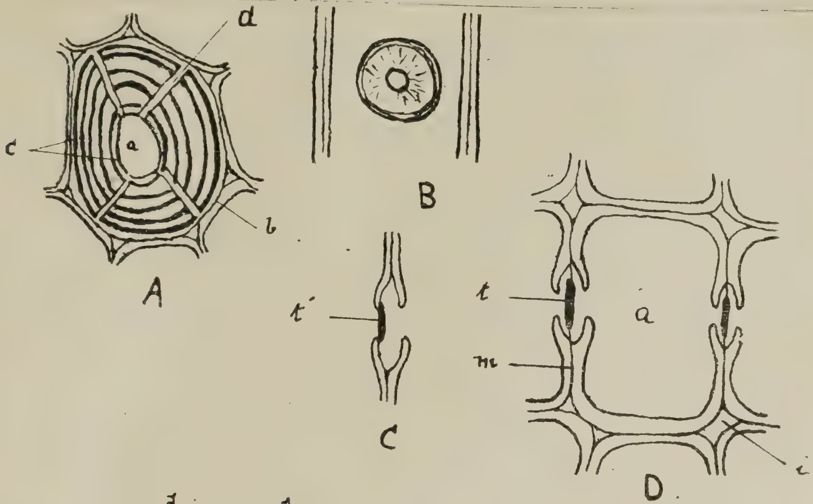

Fig : 1

FIGURE 1.—A.—Transverse section of a lignified cell. *a*—Cell cavity; *b*—Primary wall; *c*—Thickening layers of secondary deposit; *d*—Simple pit canal.
B.—Bordered pit in surface view.
C.—Same in tangential view. *t′*—Loins closing pit-cavity.
D.—Transverse section of a tracheid. *a*—Lumen; *m*—Primary cell wall; *t*—Loins; *i*—Intercellular space.

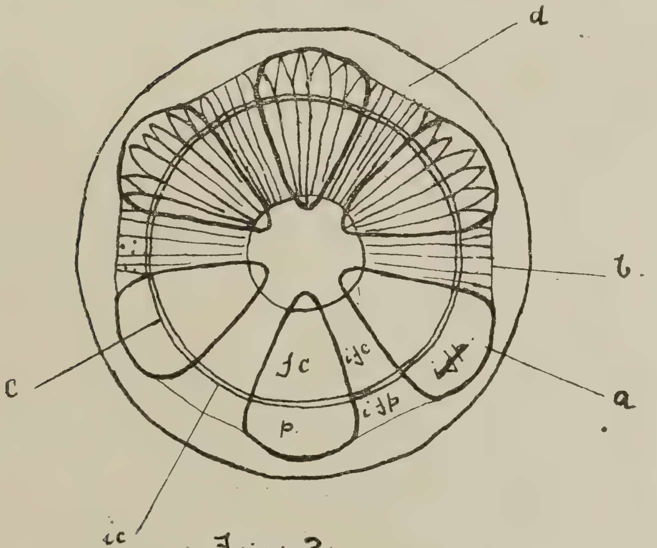

Fig: 2

FIGURE 2.—Diagrammatic representation of transverse view of an exogenous stem at the commencement of the formation of secondary tissues. *c*—Fascicular cambium; *ic*—Interfascicular cambium; *a*—Primary fibro-vascular bundle strand; *b*—Secondary fibro-vascular bundle strand; *fc*—Wood formed by the fascicular cambium; *ifc*—Wood formed by the interfascicular cambium; *p*—Bast formed by fascicular cambium; *ifp*—Bast formed by interfasicular cambium; *d*—Tissues exterual to first-formed bast, consisting of the pericycle, primary cortex, and epidermis. The upper shaded part of the figure shows medullary rays.

year. In them the differentiation, and maturing of the primary tissues, marks only a primary stage in the development of what is popularly known as wood and bark.

(*a*) The Cambium.—In the previous instalment of this article, appearing in the April number of this *Journal*, it was said that in an exogenous shoot, upon the differentiation of the primary tissues, the vascular strands were arranged in a ring immediately within the periphery of the Central Cylinder. Each strand consisted of an outer or Bast and an inner Xylem, or wood portion, divided by a band of primary meristem termed the Fascicular Cambium. The several strands were separated from each other by radial rays of ground tissue, the primary medullary rays (see Fig. 6, page 347).

The first step in the formation of secondary tissues consists in portions of the primary medullary rays, lying between the detached portions of the fascicular cambium, becoming active as a secondary meristem, and termed collectively the inter-fascicular cambium, because it occupies positions between the fascicular cambium. The effect is thus to produce a complete ring of cambium or active, formative or generative meristematic tissue, situated in the midst of masses of permanent tissue (Fig. 2). Although in a transverse section of the stem, the cambium appears as a ring; it occupies—in a similar position—all portions of the stem, roots and branches wherever secondary tissues are being formed, as a thin sheet of actively growing and multiplying delicate cells. The cambium functions as a centre of activity from which the masses of tissue contributing to the growth in thickness of the skin originate. Apart from the inherent peculiarities of any one species, the state of its health, and the nourishment available, must therefore determine the quality and quantity of the material it produces.

Cambium cells take the shape of rectangular prisms, with the ends sharpened or bevelled like the cutting edge of a chisel. In other words, they are brick-shaped, with bevelled ends. Each cell is so placed that the broader side occupies a position at right angles to the medullary rays, the bevelling of the ends being along lines parallel to the direction of the rays.

(*b*) Growth in thickness in an exogenous stem.—With the completion of the cambium ring secondary vascular strands, containing both xylem and bast, are intercepted between the original ones (Fig. 2, ifc. ifp). The effect is to produce a close ring of fibro-vascular bundles or strands, separated from each other by medullary rays (Fig 2). With the continued activity of the cambium ring fresh material is added to both xylem or wood, and bast or living bark, of all the vascular strands, as well as to the medullary rays. The vascular strands now lose their original pear-shaped outline, and become wedge-shaped, with their broader ends directed outwards. The appearance presented by the transverse section of the stem may now be compared to a wheel. The hub would represent the central pith. The spokes the radial bands of medullary rays, and the spaces between them the vascular strands, both wood and bast, together with the cambium ring; while the fellars and tyre would represent the now functionless epidermis, primary cortex and pericycle, destined to be cast off as the first shed bark. See also Figure 2.

As the vascular strands broaden with the increasing girth of the stem, secondary medullary rays arise, subdividing the original strand. Such secondary rays, since they arise subsequently, are found to end blindly in the wood at one end, and in the bast at the other; and may by this means be distinguished from the primary rays. (See radial and transverse views of rays in Fig. 3.)

The activity of the cambium continues throughout the life of the tree. Its cells grow and multiply, contributing material for the formation of fresh wood and bast, and adding to the tissues of the medullary rays. The new material thus formed is deposited in concentric, superimposed layers, the new wood being placed outside the older wood; and the new bast inside the older bast. Such is the principle of secondary growth in the stem of an Exogen. The transverse section of the stem (Fig. 3), while it now presents an appearance more in keeping with wood as we meet with it in the form of timber, might seem irreconcilable with the appearance presented by a similar section of the same shoot at a much earlier stage. A careful comparison of Fig. 6, page 347, of the April number of the *Journal*, with Figs. 2 and 3, accompanying the present instalment, is recommended to elucidate the difficulty, should such exist.

In studying the structure of wood, or in the comparative study of different species of wood, all requirements are best met by using specimens of the shape represented in Fig. 3. Such a specimen represents sections of the stem in three different directions at right angles to one another. Thus in the figures—both A and B—the direction "q" represents a transverse section of the stem cut at right angles to its axis; "l" a radial section, cut parallel, and "t" a tangential section cut at right angles to a medullary ray. In this figure, A represents the stem of a conifer, and B that of a tree of the broad-leaved class.

We are already familiar with the general structure and appearance of the stem of an Exogen exhibiting secondary growth, and of the manner in which secondary tissues are developed. The histology, or minute structure, of the cambium has also been described. We will now proceed to describe the histology of the remaining masses of tissue which build up the stem. There remain the vascular strands, and the medullary rays. To facilitate description we shall speak of the xylem, or wood portions of the vascular strands, as the wood strands; and of the bast portions of the bast strands.

(*c*) Elements of secondary growth in the wood strands of conifers

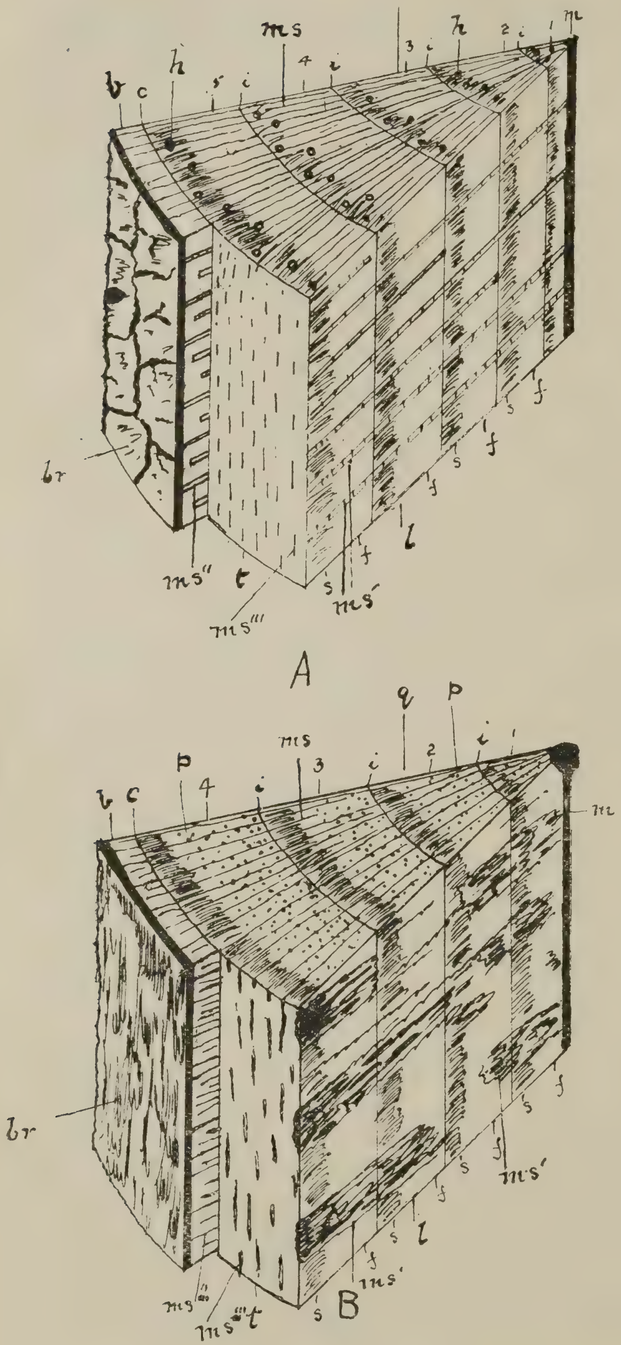
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FIGURE 3.

A.—Portion of a stem of the Pine (representing the conifers); and

B.—Of a broad-leaved species. A.—Five years old. B.—Four years old. Both cut in winter:—

q—Transverse view; *l*—Radial view; *t*—Tangential view; *f*—Early wood; *s*—Late wood; *m*—medulla; *1 to 5*—The successive annual rings of the wood; *i*—Junction of the wood of successive years; *ms, ms''*,—*ms'''*—Medullary rays in transverse, radial, and tangential view; *ms''*—Radial view of medullary rays in the bost; *c*—Cambium ring; *b*—Bost; *h*—Resin ducts; *p*—Vessel pores in transverse view; *br*—Bark external to the peredium layer.

and broad-leaved species.—The cell-wall of a growing cambium cell—like the cell-wall of every such vegetable cell—is very thin, transparent, highly elastic, and permeable to fluids; and consists largely of a material termed cellulose. When, however, such a cell attains its full size, becomes an adult and enters into the composition of wood or bast, its cell-wall undergoes a change in structure. It becomes thickened by the superposition of a series of coats or lamellae deposited on the inside of the primary cellulose wall (Fig. 1, A). The material of the thickening layers consists largely of a hard, inelastic substance, more or less impermeable to fluids, termed lignin. Hence we speak of such cells as becoming woody, or lignified. As the cell-wall thickens the cell cavity, or lumen, diminishes, and becomes nearly or quite, obliterated.

The thickening of the cell-wall does not take place uniformly over the whole surface. Some portions are thickened, while at other points the original or primary cell-wall remains unaltered. As the holes thus produced in the contiguous lamellae correspond with one another, pores are gradually formed penetrating the thickening layers and leading towards the centre of the cell cavity (Fig 1 A, d). These pores or pits present either a circular or an oblique outline. Such cells when seen under the microscope transmit the light differently through their pore canals and their thickened walls, and hence they present a pitted or dotted appearance, as though pierced by a number of holes. Such cells are known as "pitted cells," and the pore canals as "simple pits" (Fig. 1 A, d). The pits from adjoining cells converge, and would form continuous canals, were it not that the primary cell-walls persist as a closing membrane between two converging pits. In the structures known as "Bordered pits" (Fig. 1, B.C.D.) the pit canals are widened towards the closing membranes, the canals being thus conical or funnel-shaped, instead of cylindrical. Further, in "bordered pits" the closing membrane is thickened at the centre to form a "Torus" (Fig. C.D., t, t′). By the coming to one side or the other of the closing membrane, the torus may so act as to close the orifice of the pit canal (Fig. 1, C). Bordered pits therefore act as values and are only formed in cells, which are soon to lose their protoplasmic contents, and serve only as channels for conducting water.

We may divide the elements of secondary tissues, according to their functions, into two broad classes:—1. The tracheal elements (Fig. 4, A), which lose their protoplasmic contents very early, have walls provided with circular, or obliquely elongated bordered pits, and serve as water conductors, being the channels along which water absorbed from the soil by the roots is transported to the leaves.

2. The Parenchymatous elements (Fig. 4, B) which retain their cell contents indefinitely, and contain starch, glucose, and other reserve food material, or, losing their cell contents, ultimately become filled with air and serve a purely mechanical function in the economy of the stem.

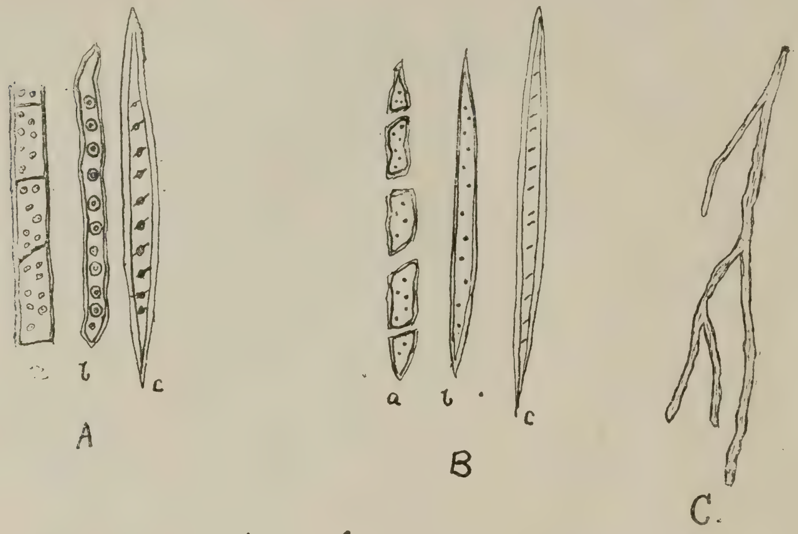


Fig: 4.

FIGURE 4.

A.—Tracheal elements of the wood. *a*—Portion of a trachea or vessel; *b*—A tracheid *c*—A fibre tracheid.

B.—Parenchymatous elements of the wood. *a*—Wood parenchyma; *b*—A fibrous cell or intermediate wood fibre; *c*—A libriform or true wood fibre.

C.—Portion of latex tube.

The walls of all such elements are provided with round or elongated simple pits.

The tracheal elements include:—

Tracheal or vessels formed by the fusion of several cambium cells, with bordered pits, thin walls, and wide lumens. They form a system of long, extremely fine tubes traversing the wood strands of broad-leaved species, and appearing as pores in a transverse section of wood (Fig. 4, A, a).

Tracheids, formed from a single cambium cell, with blunt ends, comparatively wide lumens, and large circular bordered pits (Fig. 4, A. b).

Fibre Tracheids, formed also of a single entire cambium cell, with pointed ends, smaller lumens than in the tracheids, and small obliquely elongated bordered pits. In extreme cases they become filled with air, and exercise a merely mechanical function (Fig. 4, A. c).

The Parenchymatous elements (Fig. 4, B) include:—

Wood parenchyma, nearly isometric cells, formed by the transverse division of cambium cells. They are provided with simple pits, and retain their protoplasmic contents for an indefinite period. In sap or living wood they generally contain in addition starch and other carbohydrates (Fig. 4, B, a).

Fibrous cells, or intermediate wood fibres, resembling wood parenchyma in their cell contents and their cell walls, but elongated and formed of an entire cambium cell. (Fig. 4, B. b.)

Libriform or true wood fibres: long, pointed cells with very narrow or almost obliterated lumens, and hard and thickened walls provided with obliquely elongated simple pits. They are exceptional members of their class in that they lose their cell contents very early, are filled with air, and only serve a mechanical purpose, contributing largely to the hardness of wood, and the rigidity of the stem. (Fig. 4, B. c.)

Both geological and botanical evidence lead us to infer that conifers existed on the face of our planet before plants of the broad-leaved class. They represent an earlier and simpler type of vegetation. In their stems, leaves and fructification they exhibit a less elaborate and more elementary structure. It is well to remark here that the wood of conifers, being of a simpler construction, more easily deteriorates in its

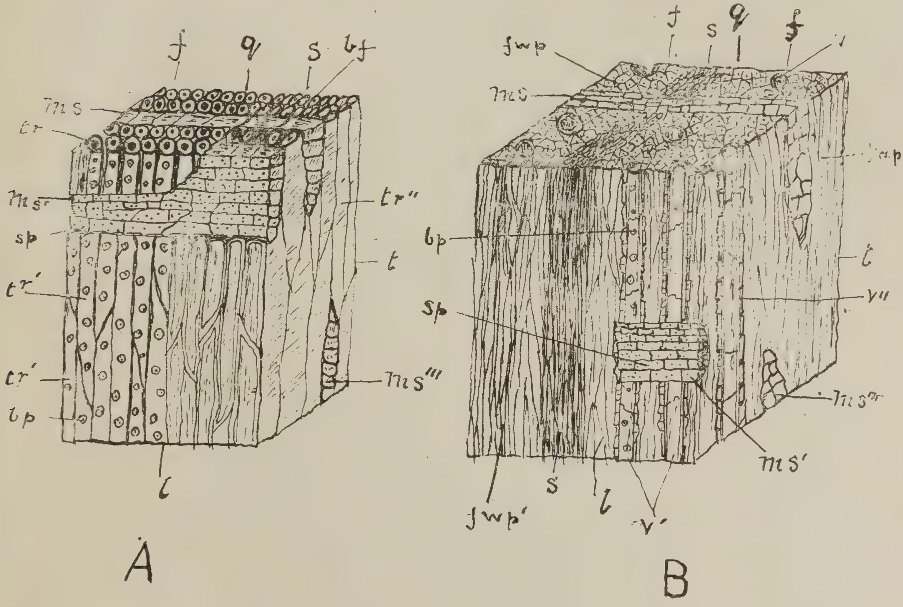


Fig: 5

FIGURE 5.

Diagrammatic representation of a piece of wood. A.—Of a conifer. B.—Of a broad-leaved species. Both highly magnified. *q*—Transverse view; *l*—Radial view; *t*—Tangential view; *f*—Early wood; *s*—Late wood; *ms*, *ms'*, *ms'''*—Medullary rays in transverse, radial, and tangential view; *bf*—Broad fibres of the conifers; *tr*, *tr'*, *tr''*—Tracheids in transverse, radial, and tangential view; *fwp*, *fwp'*, *fwp''*—Transverse, radial, and tangential view of wood fibres, and wood parenchyma in wood of a broad-leaved species; *v*, *v'*, *v''*—Transverse, radial, and tangential view of vessels; *bp*—Bordered pits; *sp*—Simple pits.

timber value than that of broad-leaved species, as a result of faulty cultural treatment. How this is brought about will be explained later. The wood strands of conifers consist almost exclusively of tracheids, closely interlocked by their ends becoming pushed between one another. Wood parenchyma is also present, investing the tracheids. The water-conducting tracheids abut upon the living parenchymatous elements, and are in communication with them by means of their bordered pits. (Fig. 3, A. and 4, A.)

The tracheids formed early in the growing season—the spring wood —when growth is most active, have larger lumens and thinner walls than those formed later in the growing season—autumn wood. The tracheids of the autumn wood are much broader in their tangential than in their radial directions, and are sometimes termed "broad fibres" (Fig. 5, A. s.).

In addition to tracheids and wood parenchyma, the wood of certain conifers, *e.g.*, the Pines (*Pinus insignis, Pinus pinaster*) contain resin ducts (Fig. 3, A. h.). Resin ducts are long passages or canals traversing the wood strands and situated principally in the late or autumn wood. The ducts are surrounded by cells which secrete resin, which collects in them. On a transverse section of the stem, such ducts appear as pores in the wood, from which—in freshly-cut wood—fluid resin exudes.

The wood strands of broad-leaved species exhibit a more elaborate structure. In addition to the tracheids and wood parenchyma, there are present the characteristic vessels or tracheae which appear as pores in a transverse section of the wood and the various forms of wood fibres already described. As in the wood of conifers, the different elements are firmly locked together, the water-conducting elements abutting upon those with living contents, with which they are in communication by means of their bordered pits. (Figs. 3, B. and 5, B.)

The elements with wider lumens, particularly the vessels, are most abundant in the early or spring wood. On the other hand, in the late or autumn wood the elements with narrow lumens and thick walls, particularly the true wood fibres, predominate.

Although as a rule the tracheae or vessels occur in nearly all broad-leaved species (they being absent in conifers, which fact affords a ready means of differentiating between wood of the two classes), all the other elements need not, however, be present in one and the same species. For instance, in the Willows and Poplars the tracheal elements are represented solely by vessels. Whenever in any species the true wood fibres form a comparatively large proportion of the elements of the wood strands, they must obviously greatly enhance the firmness and hardness of the wood. In oak wood such fibres comprise most of the late wood. In such soft woods as the mango they are entirely absent, or but sparingly represented.

The distribution and properties of the tracheal and parenchymatous elements in the wood strands of conifers and broad-leaved species may be summarised as follows:—

The tracheal elements predominate in the early or spring wood, when water-conduction is most important. They function as water carriers, being the channels through which water is conducted from the soil to the leaves. In performing this function they are assisted by the living parenchymatous elements, which invest them in a sheath. This fact is important physiologically. All attempts to explain the ascent of water from the soil to the tops of all trees by such purely mechanical laws as capillarity, etc., failed; and it was only when scientific men began to recognise that the water-conducting elements were in intimate communication, by means of their bordered pits, with the living elements which accompanied them, and a practical solution to the problem became possible.

The parenchymatous elements predominate in the late or autumn

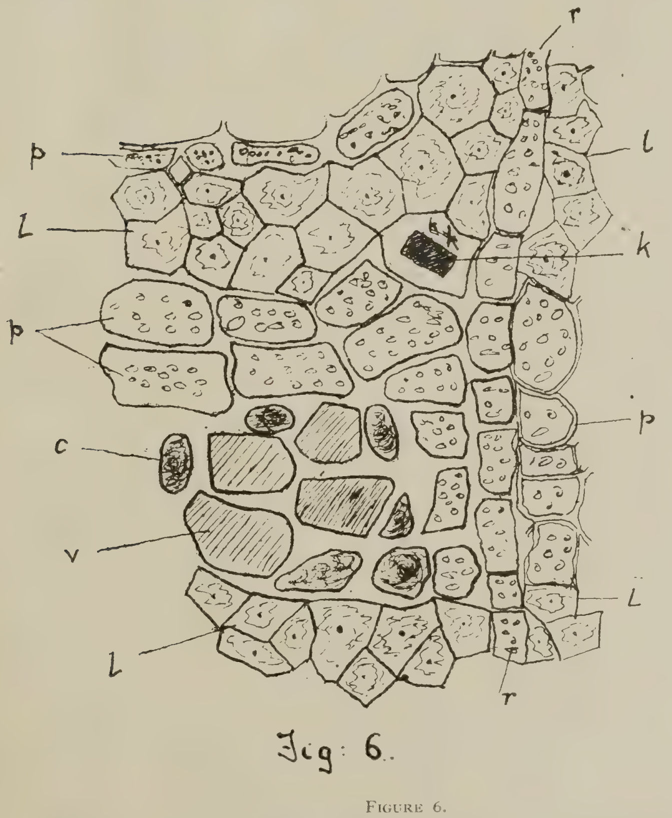


FIGURE 6.

Portion of the transverse section of the bast of the lime (*Filia parvifolia*). *v*—Sieve tubes; *c*—Companion cells; *k*—Cell of bast parenchyma containing a crystal; *p*—Bast parenchyma; *l*—Bast fibres; *r*—Medullary ray.

wood, when storage of reserve food material for consumption at the renewal of the ensuing growing season is important. In addition to their protoplasmic contents, they contain starch, sugar, and other carbohydrates, and, in smaller quantities, even proteids.

Finally both classes of elementary organs aid in maintaining the elasticity and rigidity of the stem; and in their extreme development produce such elements as the fibre tracheids in the one case, and the "true wood fibres" or the "libriform fibres" in the other, which are only capable of performing purely mechanical functions.

(*d*) Elements of Secondary Growth in the bast strands of Conifers, and Broad-leaved species.

As in the case of the wood strands, the elements of the bast strands may be divided into two broad classes:—

1. The sieve-tube elements: consisting of sieve-tubes or bast-vessels, resembling the wood vessels in that they consist of long, fine tubes formed by the fusion of several cells, but differing from them in retaining their protoplasmic contents, and in the partition walls between the several cells being perforated in a sieve-like manner, instead of being altogether absorbed (Fig. b. v.); companion cells: elongated parenchymatous cells with abundant cell contents, arising together, and closely associated with the sieve tubes. (Fig. b. c.)

2. The parenchymatous elements, consisting of bast parenchyma, resembling wood parenchyma (Fig. 6, p.); bast fibres, long, narrow, fibres with strongly thickened walls. (Fig. b. l.)

In the Conifers, companion cells are always absent, while the bast fibres may or may not be present. In the bast of trees the different forms of elements generally form alternating bands, *e.g.*, the Lime (*Tilia parvifolia*). (Fig. b.)

The sieve-tubes conduct down the stem the proteid substances of sap elaborated or manufactured in the leaves; while the storage and conduction of the carbohydrates devolves upon the bast parenchyma. These cells also contain various by-products, such as calcium oxalate and tannins, evolved during the manufacture of the food substances; and sometimes alkaloids, such as quinine found in the bast parenchyma of the Cinchona (*Cinchona succirubra*). In species utilized commercially for the extraction of tannin—*e.g.*, the Black Wattle (*Acacia decurrens v. molissima*)—the percentage of this by-product in the cells of the bast parenchyma is high.

Bast fibres contribute to the rigidity of the bast structure. On the number, variety, strength and length of these fibres depends the commercial value of the bast of such species as the lime (*Tilia panifolia*) and the Rhea or Ramie (*Boehmeria nivea*), and other species.

In many plants of such botanical families as the *Urticaceae, Euphorbiaceae, Asclepiadaceae, Apocynaceae,* and a few others, there are found associated with the elements of the bast strands structures known as laticiferous vessels and laticiferous cells. (Fig. 4, C.) The former are long, simple or branching tubes with anastomosing ends formed by cell fusion. The latter are much elongated and sometimes branched single cells. Both structures contain a milky, often coloured, sap, termed "latex." The latex of several species contains characteristic ingredients. In the rubber-producing plants—*e.g.*, Para rubber (*Hevea Braziliensis*), India rubber (*Ficus elastica*), the Ibungu Vine (*Landolphia kirkii*), yielding our Colonial rubber, and many others, the latex contains caoutchouc, which forms the staple of rubber. The latex of the Poppy (*Paparier somniferum*) contains opium; that of the Papaw (*Carica papaya*) peptonising ferments, and that of certain Asclepiads, poisonous alkaloids.

(*e*) The Medullary Rays.

The medullary rays consist of nearly isometric, or brick-shaped parenchymatous cells. (Fig. 5, ms. ms′. ms″.) They form radial bands of living tissue, intersecting the wood and bast strands, and thus link together the living elements of the wood and bast. (Fig. 3, ms. ms″. ms‴.) They are in intimate communication with the conducting elements of the wood conveying the crude sap to the leaves, and those of the bast, conveying downwards the elaborated or manufactured sap. They thus form a means of communication between the two great systems of sap circulation in the stem, drawing away from the cells of the bast prepared food material to nourish the cambium, and the living elements of the wood.

In many, if not in all, pines and a few other conifers, the medullary rays are traversed by horizontal resin ducts. These ducts communicate with the vertical ducts in the wood, and by this means resin exudes readily from surface wounds made in their stems, *e.g.*, *Pinus pinaster, P. australis, P. longifolia, Picea excelsa.*

The contents of the medullary ray cells are similar to those obtaining in the parenchyma of the wood and bast strands.

(*f*) Annual Rings.

If a cross-section of a "deal" or yellow-wood plank or scantling were examined carefully, the surface would be found to be divided up into a number of zones composed of alternating bands of lighter and loose-textured, and darker and firm-textured tissue. The surface of cross-section of a piece of wood of most of our indigenous mid-land broad-leaved species would exhibit a similar differentiation. In the transverse section of a stem, these alternating bands of tissue take the form of nearly or quite concentric, complete zones or rings; the limits between the successive rings being in a great number of cases so sharply defined as to be visible to the unaided eye. (Fig. 3.) Such rings are popularly called annual rings; and, where they in reality express annual instalments of growth, are used to compute the age of the tree, each annual ring being represented by a zone of light and a succeeding zone of darker-coloured tissue.

Annual rings are expressions of the periodic activity of the cambium, occasioned by regularly recurring climatic variations.

With us, the rise in atmospheric temperature, and the renewal of the annual rains heralding the spring, exert upon vegetation a stimulus, to which they respond by a renewed activity in growth. The part of a tree, particularly of one standing in a forest, to be earliest affected by such a stimulus, is the crown. The shoots elongate, and expand their leaves rapidly, seeking to present a large leaf surface to the influences of air and sunlight. The tree at this early stage of renewed growth depends for its food supplies very largely on the stores of nutriment packed away in the parenchyma of the wood and bast strands, and the medullary rays.

The cambium is more slowly healed and becomes active later than the crown. Water conduction being most important during the stage of active growth in the shoots and leaves, the cambium cells produce largely tracheal elements, the tracheids in conifers, and the vessels and other forms of tracheal elements in broad-leaved species. Since the food supply available at this early period is limited, and a larger and more important demand exists for it in the crown of the tree, the cambium tissue at this stage is but poorly nourished, and produces loosely aggregated elements with thin walls and wide lumens. Wood of this nature formed early in the growing season is termed the "early" or "spring" wood, and in a cross-section of the stem is represented by the lighter-coloured and loose-textured zones of tissue. (Figs. 3, A. f. and 5, A. f.) In broad-leaved species the spring wood is also characterised by the vessel pores exhibited in a cross-section of the stem. (Figs. 3, B. f. and 5, B. f.) Such pores are less frequent, or altogether absent in the later formed wood.

Toward the latter end of the growing season, there is a change in the general order of things. The twigs and leaves have matured, and the crown presents its full extent of leaf surface to the action of sunlight and air. While on the one hand the demand for large food supplies in this quarter is at an ebb, on the other the leaves themselves manufacture a large quantity of such material. The result is an enhanced flow of elaborated sap down the stem, chiefly along the conducting tracts of the bast. The cambium is now better nourished than earlier in the season, and responds by producing wood of a dense texture, consisting of elements with thicker walls and narrower lumens. Moreover, water conduction to the crown now being not so important, the parenchymatous and rigid maintaining elements predominate. Such wood formed late in the growing season is termed the late summer or autumn wood, and is represented on the surfaces of cross-sections of stems as zones of darker coloured, and generally firmer textured wood. (Figs. 3, s. and 5, s.) In the *Coniferae* the late wood consists largely of thick-walled wood parenchyma, and tracheids with thick walls and radially compressed lumens. In broad-leaved species the vessels, when present, are fewer in number and possess narrower lumens than in the early wood; while the different varieties of the parenchymatous elements abound.

A purely mechanical factor exerts a secondary influence in effecting the differences in texture between early and late wood. During the winter the outermost layers of the distended cortex crack, and exfoliate as dead bark. At the commencement of each growing season, therefore, the cortex fits round the wood of the tree as a comparatively loose jacket, and exerts very little pressure upon the wood. With the gradual increase in the girth of the tree during the growing season, resulting from the new layers of wood and bast laid on through the activity of the cambium, the cortex towards the end of the growing season fits very tightly, and must exert an enormous pressure upon the cambium and wood. The wood elements formed later have therefore little room for loose aggregation, and fit closely, forming a dense-textured fabric. Hence in the *Coniferae* we get those characteristic "broad fibres" with tangentially elongated lumens in the late wood. (Fig. 5, A. s.) This is obviously the shape a tube in such a position would take, when subjected to considerable radial pressure.

Where growth proceeds uninterrupted throughout the year, annual rings, are, as a rule, not evident. This obtains with the majority of tropical species. Even in the tropics, however, where regular and recurring interruptions of growth are caused by periods of drought, followed by a renewed activity occasioned by the return of the annual rains, trees may exhibit distinct annual rings. Examples occur in many Indian species:—Teak (*Tectona grandis*): Toon (*Cedrela toona*); Satin wood (*Chloroxylon sweetenia*); the Bread tree (*Melia Azedarach*), and many others.

In other tropical species again—*e.g.*, the different species of the genus *Ficus* (Figs) in at least one Australian species, *e.g.*, the Beef-wood (*Casuarina*) and in the Indian Evergreen Oaks, *e.g.* (*Quercus lamellosa*)—cross-sections of the stem exhibit what are known as "false rings." Such rings do not mark annual instalments of growth; and are revealed as complete or incomplete concentric or excentric zones of soft tissue, largely wood-parenchyma traversing the general structure of the wood. If a transverse section of a piece of wood of either the wild fig (*Ficus* sp.), growing as a climbing parasite in the forests, or of the Australian Beef-wood (*Casuarina*) were closely examined, it would be seen that each "false ring" could not very easily be confounded with the annual rings.

(*g*) Heart and Sap Wood.

The living elements of wood may remain active throughout the whole of the wood, extending even to the pith. Such wood is composed entirely of sap, or splint wood. Generally, however, the living elements in the older zones of wood die, so that only dead tissues are found at a certain distance from the cambium. The dead portion of the wood is then termed the Heart-wood or Duramen, in contradistinction to the younger zones of wood, still containing living elements, and termed the Sap-wood or Alburnum.

Heart-wood is of two kinds:—

(1) True or complete heart-wood: in which the walls of the elements become charged, or their lumens filled, or both, with various substances secreted by the living elements shortly before death. Such heart-wood is therefore of a darker colour than, and easily distinguishable from, the sap-wood. Owing to the presence of these materials in the cell walls and lumens of its elements, true heart-wood is heavier than sap- wood.

(2) Incomplete heart-wood, consisting wholly of dead tissues, but of lumens of its elements, true heart-wood is heavier than sap-wood.

Heart-wood, consisting as it does of dead elements, does not take part in any of the processes vital to the tree. Its function is mechanical, contributing to the elasticity and ridigity of the stem. It does sometimes act as a reservoir for the storage of water. Hard-wood contains very little or no reserve food material such as starch and proteids, and is therefore less exposed to the attacks of fungi and wood-destroying insects than sap-wood.

The materials impregnating the cell-walls, and filling the lumens of the elements of heart-wood, consist of gums, tannins, oleo-resins, essential oils, etc. The tannins impart to the wood a reddish or brown hue. When converted into the so-called Xylochromes or wood-dyes, they produce woods of various hues, *e.g.*, Ebony (*Diospyros ebenum*) with a black heart-wood, Campeachy wood or dog-wood (*Haematoxylon campechianum*) with a blue heart-wood.

Inorganic substances may also be found in heart-wood, *e.g.*, silicic acid in teak; calcium carbonate in *Terminalia glabra*, an Indian species. These foreign materials have for their object the preservation of wood from decay. We prolong the life of such easily destructible wood as the pines and yellow-wood by artificially introducing into the walls and lumens of the wood elements a substance with antiseptic properties, such as heavy tar-oil. This process—when tar-oil is the antiseptic medium—we term "creosoting." Nature achieves the same end by introducing into the elements of heart-wood, by natural means, such substances as gums, oleo-resins, tannins, essential oils, etc. Abstracted from all other technical virtues, the greater durability of equally seasoned and matured wood of one species over that of another, when exposed to the same set of conditions, is therefore not referable to any superiority in the chemical or molecular composition of its elements—both being identical in this particular—but to the presence of some preservation material, subsequently introduced into the walls, or lumens, or both, of the elements of the one, but lacking in the other.

(4) Bark.

The concentric zones of secondary tissues are not deposited, as we are now familiar, round the periphery of the stem, but between the wood and bast portions of the vascular strands. Consequently, it is obvious that unless latitude were given for the continued deposition of the wood and bast zones resulting through the activity of the cambium, growth in thickness of the stem must cease. The peripheral tissues of the stem first met this necessity by subsequent circumferential growth and by mechanical distension. Ultimately, however, complete or partial zones, or arcs, of the outermost peripheral tissues die and become cast off from time to time as bark.

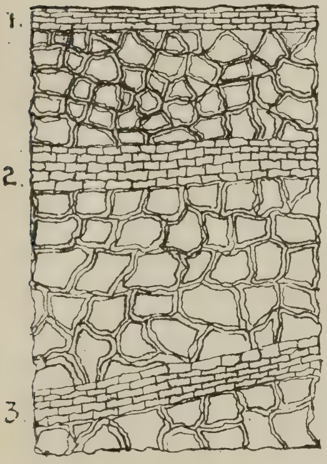


Fig: 7.

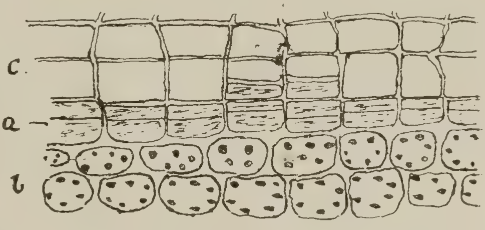


Fig: 8.

FIGURE 7.

Transverse section of a portion of the peripheral tissues of a stem. *1, 2, 3*—Successively formed layers of cork.

FIGURE 8.

Periderm. *a*—Phellogen or cork cambium; *b*—Cells of the phelloderm containing chloroplasts; *c*—Cork cells.

A bark originates in the following manner:—A formative or generative tissue arises as a secondary meristem in the parenchyma of the peripheral tissues. Such a secondary meristem is termed the Phellogen or Cork Cambium. (Fig. 8, a.) Through the activity of its cells it generates on its outer side rows of cork cells (Fig. 8, c.); and on its inner side a loosely aggregated parenchyma tissue termed the Phelloderm. (Fig. 8, b.) The cells of the phelloderm usually contain chloroplasts, *i.e.*, protoplasmic corpuscles impregnated with a green pigment termed chlorophyll, which is the green colouring matter of plants. The whole structure consisting of cork cambium, cork cells and the phelloderm, is collectively termed the Periderm. (Fig. 8.) All tissues external to the periderm are effectually cut off from food supplies, and consequently die, and are cast off by the continued growth in thickness of the stem. Before death the cells lose their protoplasmic and food contents, and become filled with waste products.

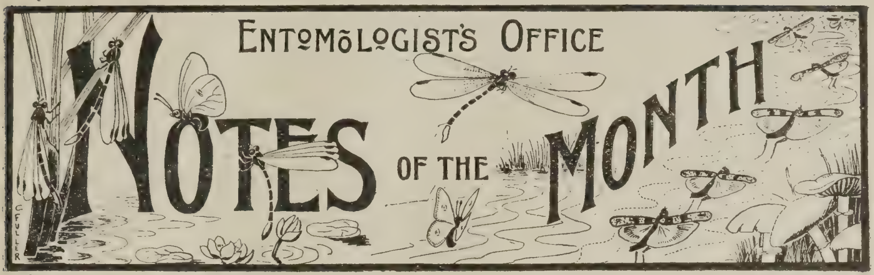
Bark, then, in its strictly botanical significance, constitutes all peripheral tissues of the stem external to the periderm. In general, commercial and popular language, however, the term has a wider significance. It refers to all peripheral tissues external to the cambium, and therefore includes the tissues of living bast concerned with processes vital to the tree, and containing cells charged with various food products such as proteids and carbohydrates, and by-products, as tannin. While, therefore, the removal of what is strictly known as bark, is not attended with injury to the tree, the complete stripping of the cortex, or bark in its latter significance—as is done in the wattle industry—results in the death of the tree.

When the external green surface of a stem or a shoot begins to turn brown, it indicates the commencement of the formation of periderm. The first layer of phellogen generally originates in the primary cortex. With the death of the tissues external to it, this layer of phellogen ceases its activity, and another is developed in a deeper-lying layer of peripheral tissue, until ultimately the phellogen comes to be joined in secondary bast parenchyma, instead of the primary tissues. (Fig. 7.)

If the layers of periderm formed constitute only arcs of the stem circumference, the bark is exfoliated in scales—*e.g.*, common yellow-wood (*Podocarpus elongata*). Bark of this nature is termed "scaly bark." When, on the other hand, the successive periderm layers form complete concentric rings, the bark is detached as a hollow cylinder, and ultimately cracks and is thrown off through the continued growth in the thickness of the stem, *e.g.*, real yellow-wood (*Podocarpus Thunbergii*), the grape vine, clematis, etc. Such bark is termed "ringed bark."

Under the four headings, the cell, the primary tissues, the secondary tissues, and bark, I have now completed the interpretation of the structure of an exogenous stem, I trust in the manner outlined in the introduction to this article. In a future instalment I hope to deal broadly with the leading cultural features in the growing of trees for timber, inferable from a study of the structure of the stem; and to outline such structural differences as are adopted as features, both in the classification and identification of wood.

Mr. St. George Arbuthnot has been re-appointed a member of the Land Board, for a period of three years from the 1st July, 1907.



Locusts in July.

Excepting for minor changes in the location of the swarms, the position of locusts in Natal and Zululand at the end of July was practically the same as in June.

There is ample justification for saying that, up to date, the Colony has not been invaded from beyond its territories. Large swarms located early in the month in the Umkusi and Pongola Thorns (Ngotshe Division) have crossed into Zululand, probably owing to the burning of the veld, and this is the only instance of a well-defined migration. In all, about 50 swarms have been reported, and it is very doubtful whether there are at present 100 swarms in our territory. There is no marked trend of flight; 7 reports show the swarms as settled, 5 as circling about in the neighbourhood, 12 as flying northerly, 15 as southerly, 3 as west and 1 east.

The condition of the locusts reported upon shows them to be generally healthy. Some sick specimens from Zululand were found infested with nematodes or worm parasites. The colour of the underwings is still clear, being only slightly suffused with pink at the base. The locusts are, generally speaking, all dark in colour, but one or two "light coloured" swarms have been reported.

Upon the whole the swarms are not large, nor is any considerable mischief being done by them. Several swarms of some magnitude have been doing a good deal of damage at Mid-Illovo Central to wattle plantations. A swarm was reported by Mr. H. Blofeld, as extending from Amatikulu Drift towards Eshowe, Zululand, a distance of 12 miles, on the 18th.

Excepting for a few stragglers in the veld, there are no locusts in the Northern Territories (Paulpietersburg, Utrecht, Vryheid, Babanango and Ngotshe Divisions).

Northern Zululand (Ingwavuma and Ubombo) is quite free, and has been so since the locusts were swept off by disease. As this area has been regarded as the wintering ground of the locusts, the present position in regard thereto is most satisfactory.

The Magisterial Divisions of Mahlabatini, Ndwandwe, Hlabisa, Emtonjaneni, Eshowe, Lower Umfolozi and Mtunzini, are all infested with flying swarms, the greatest number seemingly frequenting the Emtonjaneni Division.

In Natal, the Coast lands from the Tugela to the Umzimkulu River are remarkably free from flying locusts, but from Mapumulo in the north right through to Alfred County swarms exist in country at an elevation of from 500 to 1,500 feet above sea level.

For the week ending July 20th, "nil" returns were sent in from the following Police Stations:—Imbizane, Umtwalumi, Ixopo, Umtamvuna, Scottsburg, Durban, Hill Crest, Avoca, Tongaat, Umhlali, Greytown, Keat's Drift, Maputa and Ndumu. For the week ending July 27th, the following stations sent in "nil" returns:—Maputa, Nqutu, Inadi (Krantzkop), Stanger, Avoca, Durban, Hill Crest, Lower Umkomaas, Harding, Ntabankulu (Vryheid), Weenen, Umzinto, Equeefa and Mtinzini, Inchanga and Babanango and Ingwavuma.

LOCUST FUNGUS AND PARASITES *v.* DESTRUCTION.

It has been recently put forward that the destruction of locusts by poisoning and mechanical means tends to the permanency of the pest, because by destroying the insects the increase of the natural enemies is prevented. This contntion is, upon the face of it, a plausible one, but it is only right to point out that the facts of the case do not support it in any way. Granting that such is the case, for the sake of argument, then it is because of the extensive measures taken in Natal for the past five or even nine years to destroy locusts by poisoning that the pest is still abundant and troublesome. And if this be so, then in the other Colonies—where such measures have not been adopted—locusts should be at a discount, because the natural enemies have had every opportunity of increasing. But this is not so. Natal suffered from an abundance of locusts last summer, and so did the Transvaal, the O.R.C. and Basutoland. It matters nothing that the species differs from that which invades Natal; indeed, it rather gives point to the futility of the contention, because the Brown Locust is subject to the attack of more natural enemies than the Red Locust.

* * *

LOCUST FUNGUS.

The Latest Developments.

Anyone who has followed the controversy upon the desirability of using locust fungus and has studied the conflicting opinions by qualified observers regarding it and the unsatisfactory results attending its experimental use, could not help being struck with the unanimity of opinion amongst South African Entomologists upon the futility of using locust fungus as a practical means of combatting the pest.

The secret of all this disagreement has been exposed by Mr. Pole Evans, Mycologist and Acting Botanist of the Transvaal, who has been giving the matter his especial attention. Mr. Evans discusses the matter fully in the last issue of the *Transvaal Agricultural Journal.*

Briefly, he has discovered that the fungus that destroys the locusts can only grow upon live locusts and cannot be cultivated artificially. Hence contagion only takes place when a live locust by contact or otherwise is inoculated by the spores or seeds of the fungus that develop upon a locust. Further, the fungus which has been prepared from locusts dead of the disease, upon artificial media, is one that only grows upon dead locusts and is incapable of infecting them with disease. This fact explains a great deal, and at the same time shows why it is that when locusts which have died from the disease are used for spreading it, good results often accrue.

The light which Mr. Evans has by his minute studies been able to throw upon the subject may lead to a practical application of this natural check upon the insect with successful results.

To the lay mind it may seem extraordinary that this point has not been elucidated before, but in this connection it must be borne in mind that there is no more difficult and complicated a study than that of the fungi, that but very little is known of any fungi, and that, lastly, Mr. Evans is the first working mycologist that we have had in South Africa.

HORSES KILLED BY BEES.

Mr. P. Otto, J.P., Otto's Bluff, has kindly furnished details of the loss of certain of his horses through the attack of a swarm of bees, reports of which appeared recently in the daily Press. In the course of his letter Mr. Otto says:—"About sundown on the 28th ult. a swarm of domestic bees attacked five of my veld horses, which had just been put into a cow shed for a feed. A mare and her eight-months-old foal by

'Old Fuss' were put in a place 16 x 22 feet to be fed by themselves. Ten minutes after I saw the boy running from the sheds with a sack over his head. I knew at once it was the bees. I rushed down and let three of the horses out, but the mare and foal were then already down. I managed to get them up and out of the place. They would rear up and chop in the air with their fore feet, throw themselves down, lie as if dead for a minute or so, and groan, then jump up into the air again. They appeared to me to be choking, and the next morning they were both dead, but the other three were all right."

LOCUSTS IN ARGENTINA.

In the May issue of the *Journal* appeared a note stating that the Argentine Government was about to issue a loan of two million paper dollars for the purposes of locust destruction. This, based on a Press cable, furnished an inkling of the more or less seriousness of the situation in that country with regard to the locust pest. From English journals arriving a mail or two ago, it appears that the locust question engages the attention of the public as of importance second only after the prospects of the crops. Anxiety, however, will not manifest itself seriously until the crops have made a certain growth. It is said by those who know the country well and who have practical knowledge of farming in Argentina, that if the locusts come very early—that is, when the wheat crop is young and green—they will do scarcely any damage. On the other hand, if the locusts come when the grain is just forming, when the stalk is green and soft, the damage is irreparable. In 1896 the locusts came just at the critical time, and the wheat crop was practically destroyed. Those most familiar with the country, however, say that it is very rarely indeed that the locusts come at precisely that critical time. They either come earlier or later. If they come very early, the damage is repaired; and if they come very late—that is to say, when the wheat is in the ear and the stalk hard—the locusts perish for want of food. Before perishing, however, they lay eggs, and it is the new locusts that do the damage to the mealie crop.

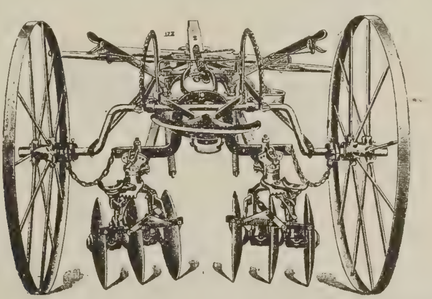
In the meantime, preparations are being made for carrying on an active campaign against the locusts. The chief effort will be directed against the young locusts, as it is their ravages that are most feared; and it is believed that, after the experience of the damage done to the maize crop in the winter and spring, every effort will be made to destroy the eggs as they are laid.

Lucerne and Other Machinery.

THE "MARTIN'S" CULTIVATOR.—MOLINE ROTARY LUCERNE CULTIVATOR. —"CAPTAIN KIDD" DISC CULTIVATOR.—"ASPINWALL" POTATO PLANTER.

IN the June number of the *Journal* there appeared an article by Mr. E. R. Sawer on "The Cultivation of Lucerne," in which particulars were given of certain experiments conducted at the Weenen Experiment Station "with a view to demonstrating the advantages accruing from a system whereby the crop is drilled and regularly cultivated." Mr. Sawer spoke of the "Martin" Cultivator as being the best machine for dry land cultivation; and for irrigated land he recommended the Moline Rotary Digger. By the courtesy of Messrs. Malcomess & Co., Ltd., we are able to publish herewith illustrations of these two implements.

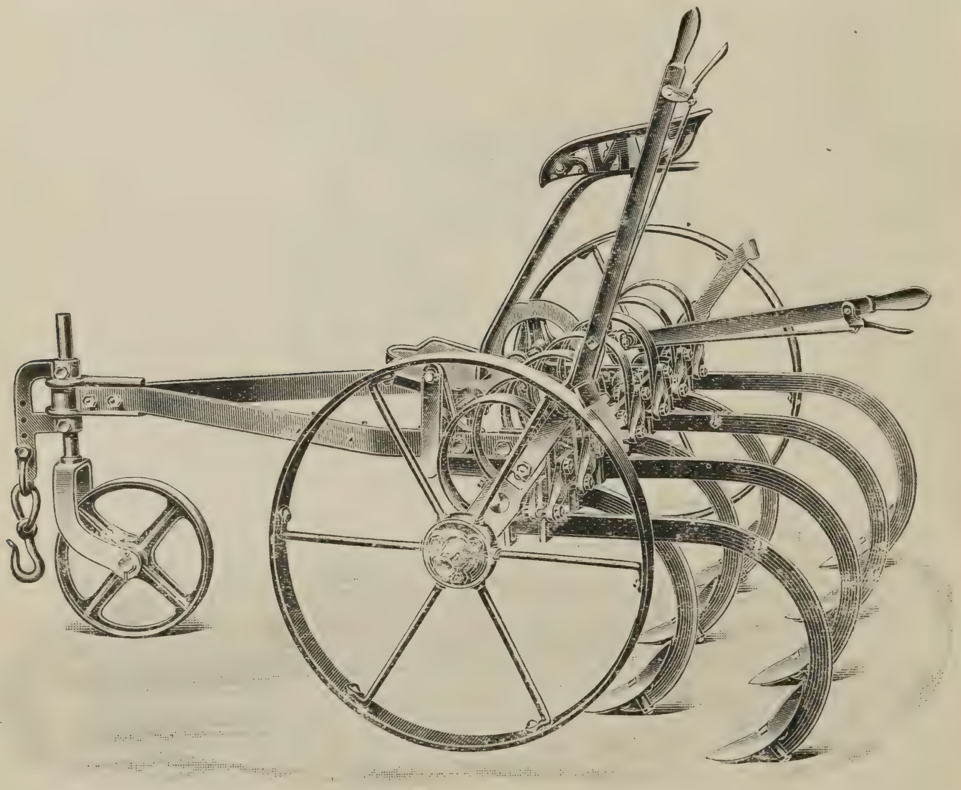
The first illustration depicts the Moline Rotary Lucerne Cultivator. This implement is one which has been specially designed by Messrs. Malcomess & Co., Ltd., to meet the needs of lucerne growers in the Cape Colony with a view to overcoming the difficulty which has been experienced in obtaining a cultivator which, whilst capable of doing good work and thoroughly pulverising the soil, will not injure the lucerne plants in any way. The teeth of this Cultivator are set on a revolving drum; and the action is such that, after the teeth have penetrated to their full depth in the ground, the continued motion of the implement causes them to revolve out of the ground again before they meet with sufficient resistence to do any injury to the plants. The implement is not a heavy cumbersome one depending upon its weight to secure penetration, but by spring pressure a uniform depth of digging is accomplished. It is amply strong, being constructed of steel and iron of the best quality. The picker frame is held parallel with the ground by



MOLINE DISC CULTIVATOR.

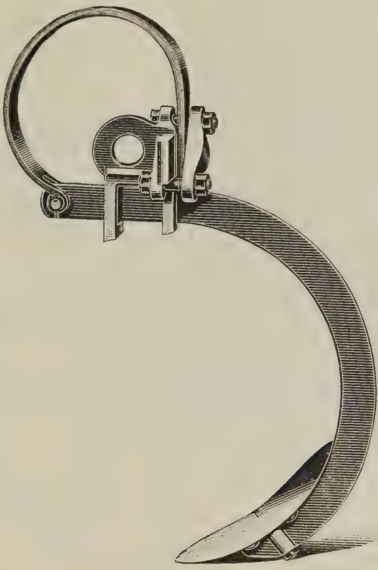
means of a yoke that connects the front end of frame and pole, and two rear yokes that attach to the axle. The pickers are of a special grade of hard steel, drop forged, and of perfect shape for their work. They have freedom of motion and, it is claimed, will not clog. To prevent clogging there is an opening at the side of each tooth, which permits the loose soil to escape instead of packing it at the front and rear and obstructing the free swinging motion of the teeth. The cushion spring and low hitch obviate any shock to the team. The wheels are 48 inches in height and have staggered spokes and removable boxes. There is a comfortable seat for the driver, and a sheet steel top is provided to guard against possibility of falling upon the digger. On account of the lifting spring little effort is required to raise the heads. The working width of the cultivator is 36 inches, and, it is stated, it has given excellent results in the Midland districts of the Cape Colony where lucerne is grown on an extensive scale.

For cultivating lucerne in very hard, unirrigated land, an excellent implement is the well-known "Martin's" Cultivator fitted with special



MARTIN'S CULTIVATOR.
Fitted with special diamond-shaped teeth.

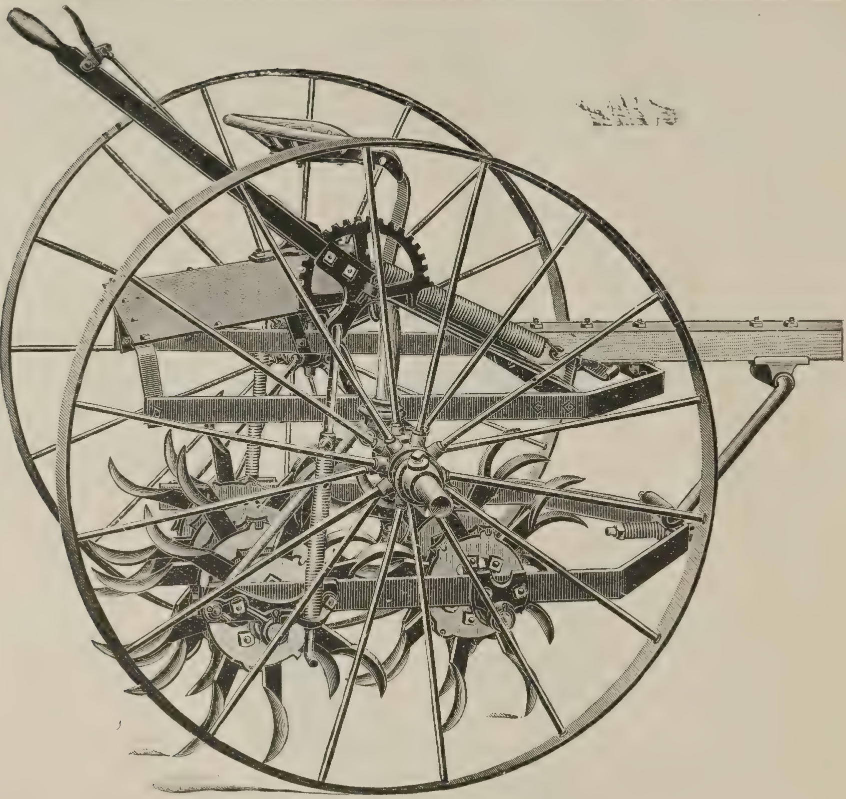
diamond-shaped steel teeth. For working under these conditions this implement has proved unsurpassed, and is now largely used by the majority of the principal lucerne growers of the Cape Colony. A separate illustration gives a closer view of one of the special diamond-shaped teeth of this machine.



A NEARER VIEW

Of one of the special diamond-shaped teeth fitted to the Martin's Cultivator.

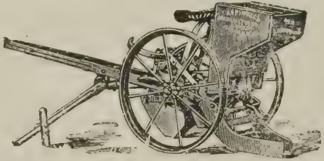
At the recent Durban Show, one of the most interesting exhibits in the machinery section was that of Messrs. Malcomess & Co., who are well-known to agriculturists in all parts of South Africa for their enterprise in the introduction of the most improved types of implements and machinery. Among the implements of special interest exhibited by them was the "Captain Kidd" Disc Cultivator. This implement is specially designed for cultivating mealies, and can also be used amongst sugar cane or any other similar crop. Being constructed almost throughout of steel, it possesses the maximum of strength whilst being very light. It is capable of numerous adjustments which can easily be made by the most inexperienced operator, and the implement is under perfect control. The axle is adjustable to permit of working between rows of different widths. The discs are controlled by a foot rest and can easily be moved from side to side and set to throw the soil either on to or away from the plants and at any angle desired; and it is claimed for them that they can be worked quite close to the plants without the least



"CAPTAIN KIDD" CULTIVATOR.

fear of injuring them. The general construction of the "Captain Kidd" is such that it can be worked among the mealies, etc., until they have reached such a height that the need for further cultivation is passed. An illustration of the machine is given herewith.

The "Aspinwall" Potato Planter also attracted a great deal of attention from potato-growers at the Show. This implement will, it is stated, plant whole or cut potatoes at any desired depth or distance apart. It opens the furrow, drops the seed, covers it up, and also distributes fertiliser if desired, in one operation. The accompanying illustration gives a good idea of the appearance of the machine.



"ASPINWALL" POTATO PLANTER.

Agricultural Geology.

By Prof. E. H. L. Schwarz, A.R.C.S., F.G.S. Rhodes University College, Grahamstown.

A PAPER READ BEFORE THE DURBAN TECHNICAL INSTITUTE.

For some years past the various South African States have maintained geological surveys, and reports more or less detailed have been issued. In Natal here the survey has been discontinued and interest in the subject has been allowed to lapse. It struck me, therefore, that on my visit to Durban a useful purpose might be served if I briefly put forward some of the benefits that are derived from a geological survey. I had the honour to be with Dr. Corstorphine when the survey of Cape Colony was started in 1896, and spent ten years in wagon and tent working in Cape Colony. I have also been able to follow the work in the Transvaal from the beginning under Dr. Molengraaff, and in Natal under Mr. Anderson. In 1896 very little had been done and nothing on a systematic scale, while to-day the amount of literature is very considerable, so much so in fact that it is exceedingly difficult for a layman to see the use of all this outpouring of descriptions, theories and controversies. Where is the practical benefit? In these hard times it is legitimate and necessary for people to make this enquiry, and unless a satisfactory answer is forthcoming it is quite right that no more funds for geological survey should be granted.

Well, there are many sides which I could touch on. First of all the educational side—for a knowledge of one's country, its physical history and mineral wealth helps one immensely in grasping the problems of population, rail and roadways, distribution of natural products and so forth. Secondly, there is the mining side of geology—and here, in a country that is dependent on its gold, diamond and coal mines, one would surely think that a scientific and trustworthy knowledge of these would not have to plead indulgence; yet the ordinary investor points to the fact that most of the mineral discoveries have been made haphazard, and just at the present time, with so many bogus schemes on hand, the speculator dreads an authoritative report by a trained geologist. The answer to the charge that no geologist has discovered a mine lies naturally in the fact that the country has not been surveyed and studied; at the present time we know roughly about one-fifth of South Africa from actual survey, and that amount has taken twelve years to accomplish. The side, however, I wish to deal with now is neither of these; it is the more humble one of agricultural geology, the knowledge of the soil and the rocks from which it is derived.

On the quality of the soil depends the value of the crops reaped from off it and the cattle that have grazed over it, and, just as in mining, without enquiring what constitutes a good soil, the agriculturist has established certain estimates derived from a consideration of results, and points to these as quite sufficient for his needs. Now in South Africa we have peculiar conditions, and the main rule-of-thumb methods in farming are derived from experience in Europe; underlying all our South African farming there is this tradition of Home methods, which may or may not be applicable to South Africa, and herein lies the true use of agricultural geology; that is to say, if we can get to the bottom of the reasons why farmers do one thing at Home, we can see whether we are right in following the procedure here, or are simply wasting our energies in so doing. Take a case in point. It is a rule at Home not to plough up the subsoil. Now the reason for this is that in regions of constant rains the fine waste particulcs of soil become washed down and choke up the pore spaces in the subsoil, which thereby becomes unaerated, cannot support the aerobic bacteria, and, as the farmers say, is "raw." If turned up in any quantity it spoils the tilth. In South Africa this process does not go on, except in the sour soils of the Table Mountain sandstone, and it is a fatal mistake to plough only to a limited depth as the subsoil is quite as productive as the surface soil.

There is a further reason why we should study our soils from a geological point of view. In Europe the soil has been worked over for centuries, and a definite relation between the soil and underlying rock has been maintained, so that waste of one has been made good by the supply from the other, and where that relation has not been the required one, people have had time to experiment and find what particular ingredients it is necessary to add in order to make the soil produce the required crops. In South Africa we are practically in a virgin land; most farms have lands which have never been touched with a plough or have never been manured. We have not had time to experiment with our soils, and besides, the population is so sparse that experience gained by one farmer is lost, or has been lost till quite recently, when there have been issued the excellent agricultural and farmers' journals. All the same if we realise what the soil is, what the rock underlying it is, we can go straight to the point and say to produce a certain crop we must add this or that ingredient or treat it in a particular manner.

There is still a third branch which lies slightly oueside my subject, but which of inquiry is closely connected with it, namely, the action of bacteria. I do not here refer so much to the nitrifying bacteria of which we have heard so much lately, but to the minute organisms which convert the inorganic substances in the soil into available plant food. In Europe the soil is thoroughly permeated with these germs; not only do they convert the insoluble substances of the rock grains into soluble substances, but their glutinous excretions help to flocculate the soil, to keep the soil particles distended and thus maintain proper aeration. Thus a soil, exceedingly poor in plant foods when analysed, by the action of these bacteria is made to yield the maximum amount. In South Africa, on the other hand, there are soils, as, for instance, the red sand of the north-west of Cape Colony, which is an ideal soil when chemically analysed, yet, just because there are no bacteria present to act as intermediaries between the soil particles and the absorbent plant roots, nothing will grow there. In other words, in Europe the farmer can almost be independent of rock influence; here, on the other hand, we must look to our rocks as conveyors of plant food.

It is manifest then that a geologist regards soil as something very different from what a farmer does. How do we define a soil?

In the first place soil consists of a number of grains divided roughly into three grades: grit, ranging from grains 1 millimetre in diameter and upwards; sand, ranging from 1 millimetre to 1-100th of a millimetre; and colloidal clay, or the fine particles that remain suspended in water. According to the proportion of these ingredients, the soil is said to be sandy, loamy or clayey. These particles in the natural state exist in a very remarkable state of aggregation, except, of course, in barren lands where they lie simply huddled together. In normal natural soil the surface is permeated with fine roots and minute filamentous organisms which are constantly growing and dying, thereby creating a porous open surface. Below, the ordinary roots penetrate, and these likewise pushing out and growing in all directions, and eventually decaying and leaving open spaces, continue the surface porous spacing. The soil particles themselves do not collapse when a cavity is left, but remain in an open network arrangement, partly through the surface tension of the moisture that surrounds them, and partly by means of cementing material, either the glutinous excretions of bacteria or fungi, or actual calcareous or siliceous cement. The natural soil then is a sort of sponge or porous membrane which has definite properties, such as being strongly absorbent of water, easily permeable to solutions of soda, retentive of solutions of potash, and strongly absorbent to gases. The fineness of the particles naturally has a great influence on the fertility of the soil, because the smaller the particles the larger is the aggregate surface exposed to the action of solvent solutions and bacteria; a tumblerful of ordinary fine clay, for instance, presents a surface of about 2½ acres, while that of sand would only present one of a hundred square yards or so. But the solvent action eventually reduces some of the particles to the finest waste, and it is this that must be got rid of if the soil is to remain fertile. The process is a fimiliar one, worms being the most widespread means of carrying this waste to the surface, where it dries and blows away. The loss is made good from the underlying rock, which becomes attacked by the solutions of organic acids, bacteria, etc., according to the demand from above.

This is natural soil, but this is just sufficiently aerated and drained to support the natural flora. In order to grow cultivated plants in the soil we must plough. Now the object of ploughing is to flocculate the soil more extensively than was the case in the natural soil, so as to bring a larger amount of surface under the influences of solution, and to do this we must stir it in the proper condition of moisture. If the soil is ploughed too dry there is not sufficient moisture round the particles to allow them to remain distended by surface tension, while if it is too wet, the particles simply float and settle as silt. In proper condition the particles will form themselves into crumbs or kernels, each containing a number of particles held together in a sort of open-work ball; the finer or more clayey the soil the larger will these kernels be, and consequently a clay soil contains when properly flocculated far more air space than a sandy soil. Lime helps immensely to flocculate the soil, and when flocculated the films of lime which become deposited on drying help to keep the particles distended. If there is no lime and insufficient bacterial life, the particles will fall back into a solid block, as may be seen on our own soils under the Drakensberg and on the Table Mountain sandstone, where the clods when dry become so hard that they require to be broken with a hammer.

With such an idea of the soil either natural or cultivated, we can see more clearly what is wanted in order to bring it into its maximum bearing capacity. In the first place we must look to the texture of the soil and see that the flocculation is maintained. In grazing land this is ruthlessly destroyed by grass fires. I know I must be speaking to unsympathetic ears when I advocate cessation of grass fires in this grass country, but the fact remains that by scorching the surface of the ground the natural aeration of the soil is destroyed; the bacteria which render the insoluble rock particles into available plant foods are burnt; the whole economy of waste and replacement, so beautifully balanced in Nature, is done away with, and the capacity for stock-feeding becomes less and less every year. It is not in my province to go into what ought to be done instead of burning, but the disastrous effects of this proceeding is so manifest all over South Africa that I cannot but lay stress on it.

In the second place, available plant foods resulting from decomposition of the rocks must be considered. In Natal all rocks, except the coarse Molteno sandstones under the Drakensberg, are rich in potential plant foods. The Table Mountain sandstone, unlike the same formation in the Colony, is practically an arkose or granite debris, owing to the ridge—the old Madagascar ridge—of granite lying so near from which the materials were derived out of which it is formed. Granite itself is the main source of all rocks, and consequently of all soils. Granite is composed of quartz, felspar and an iron-magnesium compound, hornblende or black mica for the most part. When the rock disintegrates the quartz falls apart as grains which form sands and sandstones. The felspar decomposes into a soluble portion consisting of potash, lime or soda, the last of which drains away naturally to the sea and helps to increase the natural amount of salt in it, or, in exceptional cases, as in the salt pans of the interior, it collects in certain places and is deposited; the lime and potash luckily are retained by the soil and help to form the first batch of available plant food. The insoluble portion of the felspars is aluminium silicate which forms clays, shales and slates. The hornblendes or micas yield iron and magnesium, which are easily soluble in organic acids, and the siliceous portion either dissolves as colloidal silica, when it becomes available to grasses and such like plants that require this material for their stems, or is deposited as cement among the other products of disintregation. In dolerites which form such an important feature as intrusions, and basalts which constitute the lavas of the Drakensberg, the felspars are lime-soda minerals with not potash, while the iron-magnesium mineral, in these cases, augite, is much more abundant than in the granites, and hence the iron content of the soil resulting from the breaking up of these rocks will be much greater. Derivative or sedimentary rocks are not so varied in their composition, except in some of the Table Mountain sandstones in Natal, which are made up of bits of granite with the minerals very little altered; derived for the most part from granite, the proportions of the ingredients varies with the transporting power of the water under which they were formed, sands and sandstones being laid down near the shore, and clays and shales further out; luckily, however, the sorting out is never perfect, and most sedimentary rocks contain a portion of the varieties of minerals in the original granite.

Phosphorus, a most valuable plant food, is obtained from the mineral apatite, a calcium phosphate, which exists as tiny needles in all igneous rocks, granites, dolerites, and basalts. It is very insoluble, and is rendered practically unaltered to the soil, where it becomes concentrated, as the other minerals waste away. The concentration never reaches a very large percentage as the original amount is so small, and besides it is ravenously sought for by the plant roots. How the insoluble phosphates are converted into plant food is unknown; there is probably a particular race of bacteria which is detailed to break down the phosphates. In Karroo alluvium, for instance, when dry, we can find only a bare trace of soluble phosphates, but when that same soil is moistened and brought into cultivation the amount of soluble phosphate is very large. The explanation of this is probably that the phosphate-eating bacteria have an encysted stage during which their living substance retires into minute horny shells and the organism aestivates; when the soil is moistened the horny shells break and the bacteria come out and begin feeding and propagating again. It is estimated that if these bacteria multiply by simple division and have the normal rate of increase, namely, 35 minutes for each fission, one bacterium in twelve hours would be represented by four millions of descendents. I think these facts point to bacteria being the reason of the wonderful fertility of the Karroo soil when brought under cultivation, and if so it is one of the most striking cases where Nature jealously conserves her precious assets against the proper time, for when the bacteria are encysted no waste of the phosphates can go on. The phosphates are taken up by the plants, and converted into bone substance by animals. It is curious what hunger animals have for this element and how their condition depends on a proper supply. It seems that by constant cultivation we have reduced the amount below a healthy limit. In men there is decidedly a want of the substance in our ordinary foods, and phosphatic medicines are in increasing demand, such as the pink pills, phospherine and the like. This spasmodic supply, however, cannot be as beneficial as a natural and constant one, and hence it is desirous that more phosphatic lands should be brought under cultivation. The best phosphatic soils, however, the granite soils, are often considered poor, but this is simply a case where the plant foods lie idle and the proper intermediary bacteria have not been introduced. Nothing is known yet about these phosphorous-eating bacteria, but take the analogous case of Azotobacter, a nitrifying organism that lives on dried leaves at Home; every leaf that falls in Europe is covered with Azotobacters, and the amount of nitrates fixed in the soil under the tree is very considerable. Here no Azotobacters live or have been introduced; Hall found the organism in uncultivated soil from near Mombasa for the first time after examining for it all over South Africa, so that the organism seems to be creeping south along the East Coast, but meanwhile the leaves of our forests fall and wither and no benefit accrues to the soil. Here then is a definite case in which by bringing in bacteria we could increase the yield of our pasturage; and I think that if we could inoculate our granite soils with bacteria derived from soils which do yield soluble phosphates we should render them fertile, and also produce a marked benefit in the health and energies of the people living on the products of such soil.

I should like to drive home this question of bacteria. I call them bacteria because they are minute organisms living in aerated soil, but it does not necessarily follow that all of them are strictly speaking bacteria. Their capacity for eating is enormous, and the different species affect different diets; one has been isolated in the Black Sea which feeds on pure sulphur; it separates this element from the sulphates in the sea water, and minute globules of sulphur can be seen in the bodies of the bacteria. In the Steamboat Springs of Nevada another has been isolated which has a very human partiality for gold, and in the sintery deposit from the springs these tiny organisms can be seen with their bodies charged with fine specks of the precious metal. In soil these organisms live in enormous numbers, as we can tell when new ground is disturbed, as in Rhodesia, where some of them unfortunately have been found to be disease germs. Or we can see the same thing if we sterilise soil with some disinfectant, when it immediately becomes barren. But direct investigation shows that they really do exist. Hohl has estimated that in a grain of soil in Switzerland the following numbers of bacteria live:—

Cultivated soil	5,750,000
Meadow land	9,400,000
Manure pile	44,500,000

These figures are important as they show how by cultivation we reduce the bacteria and consequently the power of soil to produce plant food from the inorganic substances, and we see how necessary it is to bear this in mind when manuring with chemical manures which are sterile. I have known of cases where basic slag has been distributed over fields of sour soil and no benefits have accrued; had a little stable manure been added the necessary bacteria for breaking down the slag would have been present and improvement of the soil resulted.

Then again some minerals are distinctly favourable to bacterial growth, just as others are the reverse; taking gypsum or calcium sulphate, the best of all, as 100, the effects of other minerals may be stated as follows:—

Gypsum	100
Sodium sulphate	47·9
Potassium sulphate	35·8
Lime carbonate	13·3
Magnesium carbonate	12·5

In normal weathering of rock a certain amount of soluble substances are produced which in the first place allow plants to begin to grow; but this is soon exhausted, and it is the residual rock waste which has escaped decomposition which forms the strength of the soil; it is the object of bacteria to break down this and complete the process of disintegration. The water of the atmosphere is charged with a very minute amount of carbonic acid; decaying vegetation, the humic content of soil, produces carbonic acid and some weak humic acids; but all these are practically useless for decomposing silicates as their action is so slow. In many of our sand-dunes, composed of broken fragments of shells, and therefore consisting to a very large extent of carbonate of lime, these weak acids are not even sufficient to decompose this substance, and the soil becomes sour, or at any rate supports the heath vegetation natural to sour soils. Conversely, in the great eruption of Krakatoa, in the Sunda Straits, when the whole island was reduced to a glowing mass of cinders and lava, Treub found that after two years the surface was slimy with minute organisms breaking down the rock into soil, and plants of all sorts were taking advantage of it.

Turning now to the question of water, another branch of agricultural geology of utmost importance, there is a great amount to be learnt by a careful study of the geological conditions. When rock is exposed to the surface of the ground it is subjected to alternating heat and cold due to the change from day to night, summer to winter, that is to say, daily and seasonal variations. When heated, rocks expand, and when cooled, contract, and just so far as the heat is enabled to penetrate so far will there be a movement of the rock substance over the inner portion which is not affected; hence in time rocks will tend to split along the junction. There is also the action of water which penetrates the cracks carrying oxygen and carbonic acid from the surface, and this decomposes certain of the substances in the rock with increase of bulk, or dissolves them leaving the rock substances cavernous. So the rock becomes fissured and permeated with water; the depth of this top fissured portion is very variable; in the Karroo it extends some 80 to 90 feet from the surface, in Rhodesia and Bechuanaland down to 300 feet. Where the rock is fissured it forms, as it were, a reservoir holding up the drainage from the surface, and wells and bore-holes put down in this zone cause this water to ooze out and thus become available for pumping. On the sides of hills this water oozes out as springs. This is the main source of our water supply. Deep seated fissures in which water flows do occur but in this country there are practically no porous rocks such as we have in Australia, Europe and America, which form large underground reservoirs, not only for water but for oil, and hence it is hopeless to put down bore-holes in South Africa for the sake of tapping supplies. Occasionally in country traversed by dykes of dolerite it is possible to find places where we can put down deep bore-holes with good chances of success, because the underground fissures are cut off at the dyke and the deep-seated water must flow along the course of the dykes. Many splendid supplies have been tapped in this way in Cape Colony, but even with so many surface indications to guide one, the attempt is not always crowned with success. Faults again act very often in the same way as dykes, but the course of water along them is even more erratic than along dykes.

With regard to dams, the question of retaining walls and bottom come within our scope, and the stability of the dam is naturally largely dependent on geological conditions. Without going into the larger questions, I may in this place point out the role which sand and clay play in making the dam bottom impervious. Naturally sand is much less porous than clay, owing to the fact that the fine particles of the latter are much more easily flocculated, that is to say, form themselves into distended crumbs or kernels due to the surface tension of the films of moisture about them. With a clay bottom then it is necessary to destroy this flocculated structure by puddling; on a sand bottom, however, the fine particles tend to sink down in between the larger grains and choke up the interspaces. On the sour soils on the Table Mountain sandstone and on the Molteno sandstones under the Drakensberg these fine particles accumulate and form a sort of hard pan; locally this is known as "pot-clay," but if one attempts to puddle it and burn it into bricks the particles simply fall apart.

The drainage of soil is another important branch of our subject. At Home we have seen that the fine waste particles become washed into the subsoil, which is thereby rendered raw. Here we have practically no subsoil, but instead we have deposits of minerals from solution during our droughts; this causes hard-pans. The most soluble substances in weak organic acids, such as are secreted by plant roots, are the iron salts, and hence where there is defective drainage these salts tend to be deposited when the water carrying them dries up. As a consequence the soil becomes cemented with iron. This iron-cemented soil is often called laterite, but it has not sufficient aluminium in it in South Africa to be correctly so termed; it is well known at Home as moor bedstone, ortstein, or, as we call it in South Africa, "ou klip." When the surface soil is washed off it forms cindery masses of ironstone gravel, often looking as if it had been burnt. This is a very deleterious ingredient in the soil; it forms an impervious layer which must be got rid of at all costs; the American method is to blow holes through it with dynamite, and subsequent cultivation will restore proper drainage, so that the "ou klip" gradually dissolves. The mischief done by this "ou klip" is that the repair of waste in the soil by supply from the rock below is cut off, and the soil becomes exhausted of necessary plant foods. A good instance of this is the soil in George and Knysna, in Cape Colony, where part of the coastal shelf is composed of Table Mountain sandstone—a pure quartz sand rock with scarcely any plant food, and part of granite consisting of all the necessary foods. A similar rock couple occurs also by Port Shepstone and in the north of Natal. In Knysna the ou klip has formed and the soil on the granite is precisely similar to that on the Table Mountain sandstone; it is distinctly sour but rich in humus and nitrogenous compounds and admirably adapted for wheat-growing if there was a small proportion of lime, potash and phosphorus to help; these constituents, however, have long been exhausted from the soil, and as no fresh supplies can be obtained from the granite below, owing to the impervious ou klip layer, the veld is simply sour grazing land. Where the land has been drained and the ou klip removed, as it has been in one solitary instance, the soil is found to be equal to the best we have in South Africa.

Hard pans form also from silica dissolved and deposited, and sometimes also from lime. This latter I have not seen in Cape Colony, but in India it forms the kankar, a solid impervious sheet of limestone underlying the soil. I understand it does form in Natal, but only in isolated nodules; still its formation shows the aeration and drainage of the soil is defective, and where it occurs it indicates that the lime that ought to be circulating in the soil, neutralising the organic aicds and helping bacterial growth, is being abstracted and precipitated. The hard pans due to rise of alkali do not trouble us much on the south-east; in the west of South Africa they cause considerable damage and have made many irrigation schemes abortive, as, for instance, the Van Wyk's Vlei Scheme. The cure for this is subsoil drainage—an expensive expedient, but carried out in Oudtshoorn with beneficial effects; mulching or loosening of the surface so as to prevent rise of subsoil water; and the growing of alkali-resisting crops such as lucerne and Australian salt-bush. The Egyptian method of leaching is impracticable in this country. Common salt does not trouble us as, owing to the fact that solutions of it pass so readily through the soil, it is easily drained away, but sodium carbonate and sodium sulphate do cause difficulties. The former, known as black alkali, is easily converted into the latter, or white alkali, by the application of gypsum.

An artificial hard pan often forms where, owing to the fear, imported from Europe, of stirring up subsoil, ploughing is carried on year after year to exactly the same depth. The surface is flocculated normally, but the fine waste particles accumulate under the tilth and choke up the interspaces, just as happens on some of our sour soils naturally. This is known as the plough sole, and is exceedingly difficult to get rid of; it is practically impervious and insoluble, cutting off all renewal or waste from below and forcing surface water to stagnate above it, while if ploughed into the normal tilth it does sterilize it in the manner feared by the farmer in the beginning.

The question of drainage has another effect in the amount of heat retained in the soil during the night. Generally on sandy soils the surface becomes rapidly cooled at night because there is very little pore space and therefore scanty reservoirs of warmest vapours; in clay soils, however, the pore space is larger, and warm vapours produced during the day are jealously retained. This fact is strikingly illustrated in the Molteno sandstone where it is traversed by dolerite dykes; the sandstone yields a sandy soil, the dolerite a rich red clay soil, and one will notice that the Kafirs always build their huts on the dolerite simply because the soil is warm at night. In this case the ferric hydrate in the dolerite soil adds to the effect as it is strongly absorbent of gases by itself. The practical application of this in elevated positions where tender plants are cultivated is obvious, as hoar-frost will not fall on the ferruginous clay soils while it may lay thick on the neighbouring sandy soils.

I have treated rocks hitherto as soil producers, but rocks are occasionally so rich in certain essential plant foods that they are mined as manures. They fall naturally under the heads of lime, sulphur, potash, phosphorus and nitrate manures.

Lime occurs in our rocks in immense quantities either as pure limestone, as in the Pal-afric beds of the Lower Umzimkulu, or in nodules or segrations in the Karroo rocks behind the coast belt. Lime combined with silica occurs in the felspars of some of the granites and always in the dolerites intrusive in the Karroo rocks and in the basalts of the Drakensberg. In the latter cases the soil is often sour above the rocks, but the lime is there, and one can by proper drainage and cultivation of bacterial growth render it available for the plants. Along the coast there is from Port Shepstone to the Durban Bluff a belt of consolidated sands for the greater part calcareous; they are easily soluble, and the iron left behind after solution colours the sand a bright red. These rocks have not been studied, but my impression is that they are the same as the consolidated sand-dunes of the Cape Colony; they are far younger than the Cretaceous rocks of Pondoland. At any rate they are calcareous sands, unlike European sea sands, which are quartz sands, and they have been formed by sea shells washed up by the tide and broken into fragments small enough to be carried by the wind. They form an immense reservoir of lime in a form which can be easily used for manurial purposes. Along the coast the wind does the transporting, and wherever these sands are carried, even on to bitter sour veld, the soil becomes sweet and productive. Being composed of broken shells, the lime also contains an appreciable percentage of phosphates, which is further beneficial.

Sulphur as a plant food occurs in the rocks in the form of iron pyrites, a mineral which occurs very largely in small crystals throughout most of the sedimentary rocks. Although it is yellow when in grains or crystals, when in thin films it is blue, and to this mineral the blue colour of most undecomposed sedimentary rocks is due. In Cape Colony it occurs largely combined with lime as gypsum in the lower Cretaceous rocks which we know as the Uitenhage series, but which do not reach into Natal; it is this ingredient which makes the soils of Uitenhage, Oudtshoorn and Robertson so specially productive. It seldom occurs in quantities which can be dug out, but occasionally it can be gathered in the form of swallow-tail crystals from the conglomerate at the base of the series. In the Colony above the boulder clay or Dwyka conglomerate there is a band highly charged with carbonaceous matter and pyrites. The boulder clay contains much lime, and a surface interchange goes on whereby the lime unites with the sulphur of the pyrites to form gypsum, and the iron of the pyrites oxidises to red or kafir ochre. We have the boulder clay in Natal and the ochreous shales above, but I do not know whether there is gypsum here as well. At the best, however, the deposit is superficial, and no great quantity exists in Cape Colony anywhere. Gypsum occurs also underlying the salt deposits in the salt pans.

Potash is very largely present in granite soils and soil derived from sedimentary rocks composed of granite waste, both sands and shales.

Soils retains potash solutions while it lets soda solutions pass freely through, and the action of potash is to promote solution of the inorganic substances. Potash is present in sea water, and hence it occurs in the deposits formed when an arm of the sea is cut off and the water evaporated. Luckily for agriculturists, at the time when our Karroo rocks were being laid down under water an immense inland sea became landlocked where Europe now lies, and by some peculiarity in the conditions, as the sea water became more and more concentrated, the various ingredients in solution separated out and became deposited independently; thus in one layer sulphates were laid down, in another common salt, but in still others, pure potash salts. These deposits were buried and now underlie Northern Europe; they have been tapped at Stassfurt and neighbouring places, and yield enough potash to supply the whole world for centuries to come. These Stassfurt deposits allow the potash salts to be won so easily and cheaply that it is needless for us to seek a South African supply, while, at best, the amount of potash needed in a soil is very small.

Phosphorus occurs as organic deposits in guano and in bones. In rocks it occurs in large quantities in fossilised droppings of extinct animals which are dug out, as in the Cambridgeshire greensand, and ground down for manure. Some of the largest deposits, however, occur in the South Sea Islands, for instance, Christmas Island, where they exist as fossilised guano beds, and are exploited on a large scale. The cheapest form of phosphate manure is basic slag, an artificial product; yet the story of how the phosphorus got into the original iron ore is purely a geological question. No natural masses of phosphate-yielding rocks occur in South Africa, but such have been worked for many years now in the Cretaceous rocks of North Africa.

Nitrates and nitrogenous compounds are either the product of direct combination of atmospheric nitrogen by means of the electrical discharge during thunderstorms, or of organic activity. In this country nitrogenous compounds exist in sufficient quantities in our soils for all purposes of plant growth, and are produced either by one or other of the above causes or by both. The application of nitrates is usually superfluous, and the use of guano, saltpetre and other nitrogenous manures is mainly beneficial from the fact that these are combined with other plant foods. Naturally nitrate occurs in great bulk in South America as a surface deposit. The mineral is found on a raised beach where guano and sea animals, shell fish and so forth had accumulated; these decaying yielded the potash nitrate, but the salt deposited along with them converted the nitrate into a soda nitrate which is practically useless. The discovery of vast deposits of potash at Stassfurt, however, came to the rescue of agriculturists and others whose life depends on blowing up their fellow creatures, and chemists were enabled to reconvert the Chili saltpetre into the proper potash nitrate. In South Africa nitrates occur under krantzes and in caves where large accumulations of droppings of bats, rock rabbits and other cave-dwellers exist. A great many syndicates have been formed to exploit these small deposits, dazzled with the wealth that accrued from the working of the Chili saltpetre—one I know appealed for subscriptions to the extent of half a million, while the total amount of saltpetre in the farm under prospect would not fill a mealie sack. The source of nitrates now is, or will shortly be, purely artificial, as there are large factories established in Europe for converting atmospherica nitrogen into compounds by the aid of the electrical discharge, so that the nitrate hunters will have no excuse for troubling us in future.

In the foregoing remarks I have outlined briefly what is agricultural geology, and I have touched on subjects which the geologist in his work has to notice and record. If our agriculture is to become more than a mere haphazard affair these facts must be understood and advantage taken of them. I do not mean that every farmer will have to become an expert geologist, but I do insist that geological data ought to be available to him to work on. I have had naturally to speak only in general terms, as I am not personally acquainted with Natal geology, which bristles with problems of a complex character, but if I have shown that my science is not a theoretical amusement, but has a practical bearing on everyday life, I shall be quite satisfied, and I dare hope that when the finances of the country become somewhat easier, this use will be recognised and a geological survey will be re-started.

His Excellency the Governor of the Transvaal has been pleased to appoint Mr. Charles Walter Howard as Entomologist of the Transvaal Department of Agriculture, with effect from the 1st July, 1907.

THE HISTORY OF THE COWPEA.—In order to clear up many questions with the history of the cowpea and its introduction into America, a botanist trained in the critical discrimination of plants and with a wide knowledge of botanical literature, went into the matter under the auspices of the Bureau of Plant Industry of the U.S. Department of Agriculture. Mr. W. F. Wight has made a thorough investigation of the history of the cowpea; and in a bulletin prepared by him he brings forward proofs of the principal points of that history, namely, that the cowpea is a native of the Afghanstan region; that it was introduced into the West Indies over two hundred years ago; and that it was subsequently brought to the American mainland, gradually extending northward until, about 1797, it reached the latitude of the Potomac and attracted the attention of such a keen agriculturist as Washington himself.

Parliamentary Notes and Notions.

By "SCRUTATOR."

Maritzburg,
17th August, 1907.

THE even monotony of the proceedings in Parliament since last month's "Notes" has been unbroken by any discussion or incident of very great concern to the farmer· The Treasurer read his Budget Speech, the first from Mr. Brunner,—a lucid exposition of the present state of the Colony's trade and the general financial position ; Parliament has since then been mainly occupied with the Estimates; and in addition various of the Bills outlined in last month's "Notes" have engaged some portion of the attention of members There have, in addition, been lengthy discussions on such important subjects as Zululand land titles, and the Indian question.

The Budget Speech.

A perusal of the Budget Speech leaves the impression that Natal is not in such an unenviable position as pessimists are too fond of telling us. Our Customs statistics show a condition of things that, in spite of the present severe depression, promises well for our chances of a prosperous state in the comparatively near future; they show, at any rate, that Natal has undoubted potentialities and is not the resourceless country that some people would have us believe. During 1906 there was a heavy decrease in our imports, whilst there was a marked increase in our exports of South African produce. Imported goods were very largely displaced by similar articles of local production; and this is, as the Treasurer pointed out, indeed a satisfactory feature, as it shows that the Colony is making progress in the production and manufacture of goods for her own as well as her neighbours' use. Some of the main decreases were in ale and beer, biscuits, fresh and frozen meat, soap, sugar, and wood manufactures—goods which are now to a large extent produced locally.

Natal's Trade in 1906.

Our imports during 1906, from all sources, reached a total value of £11,131,000, a decrease of 10·2 per cent. compared with the previous year. Goods of United Kingdom origin, which in 1904 represented 58·8 per cent. of the total merchandise imported and in 1905 had fallen to 55·2 per cent., were further set back last year to 52·2 per cent.. The proportion of our imports from foreign countries increased from 24·7 per cent to 30·3 per cent. during the same period. Our total exports amounted in 1906 to £9,601,000 (exclusive of specie), a decrease of £629,000, equal to 6·1 per cent. This was not, however, a real set-back, as the decrease was confined to imported goods re-exported, a decrease that was natural in view of the decrease in our imports during that year. The following statement will show the direction and proportion of our exports in 1906-7 as compared with 1905-6:—

	1906-7.	1905-6.
Imported Goods Re-exported:—	£	£
Oversea	376,078	268,972
Overland	4,863,542	5,802,508
South African Produce:—		
Oversea	1,755,497	1,614,512
Overland	1,205,645	1,142,866
Raw Gold	1,183,129	1,109,644
Total Exports	£9,383,891	9,938,502

The Treasurer points out that the outstanding feature of the Colony's trade is the "steady and rapid growth in the export trade in articles of South African produce or manufacture." Since 1903 there has been an advance of 76·1 per cent. in our exports of South African produce: in that year our total exports of South African produce were of the value of £1,530,000 only, whilst in 1906 the figures had risen to £2,695,000. The following statement shows the principal articles contributing to this increase:—

VALUE OF SOUTH AFRICAN PRODUCE EXPORTED.

	1906	1903
	£	£
Bark	89,000	71,000
Coal	552,000	312,000
Fruit	127,000	75,000
Hair	55,000	31,000
Hides and skins	76,000	23,000
Jams and jellies	14,000	6,000
Maize and maize meal	182,000	46,000
Matches	74,000	12,000
Sugar	403,000	324,000
Wool	537,000	292,000
Other products	586,000	338,000
	£2,695,000	£1,530,000

Guided by these figures, says the Treasurer, it is reasonable to conclude that, although the past three years have witnessed a severe falling off in revenue through the Customs, and have placed a severe strain upon many commercial firms, the aggregate wealth of the community has not suffered greatly. "A moderate proportion only of the total value of imported goods represents actual profits within the Colony, and these profits accrue to importers and dealers; whereas in the case of South African produce or manufactures exported, a much greater proportion of the value benefits either the grower, or manufacturer, the person whose labour is utilised in its production, or the agent employed in its transit to the port of shipment. Clearly, then, efforts should be made to further develop existing industries, and to initiate any others offering reasonable hope of success."

In this connection, the opportunity may be taken to remind readers of the Treasurer's explanation of the reason for increased taxation—or, to speak more accurately, for altering the incidence of taxation. The fresh taxation proposals brought forward by Government at first sight have a depressing effect (in more than one sense, perhaps!), in that they seem to point to a greater degree of distress in the trade and general economic position of the country than is really the case. After pointing out the evidence contained in the Customs statistics of the Colony's rapidly increasing ability to supply produce and manufactures for its own consumption, and the consequent fact that we shall, year by year, require to import a smaller quantity of goods from beyond our borders, Mr. Brunner remarks that these imports form one of the principal sources of revenue, and that, therefore, the gratifying increase of the Colony's products has brought about the inevitable decrease in the amount derived from Customs duties. "The expenses of the administration of Government must, however," he says, "be provided for, and as the taxes imposed through the Customs can no longer be relied upon to yield a sufficiently large sum, it becomes necessary to alter the incidence of taxation, and to obtain from other sources revenue for the requirements of the Treasury."

Agricultural Bills.

Fair progress has been made with the Bills which have been introduced into the Assembly. With certain amendments, the East Coast Fever Fencing Bill, the Tuberculosis Prevention Act Amendment Bill, and the East Coast Fever Loan Act Amendment Bill, have passed through both Houses. The East Coast Fever Act Amendment Bill has been read a third time by the Assembly; and a further Bill ("to prohibit the export of ostriches and ostrich eggs") has been introduced and read a first time.

On the motion of the Minister of Agriculture for the third reading of the East Coast Fever Amendment Bill, Mr. Hyslop asked that some explanation be given by the Minister as to what exactly were the powers conferred by the Bill. He thought this explanation was desirable because there was great ignorance on the part of people in the country as to what had been done in the matter. The farmers would probably not understand that compulsory slaughter had been resolved upon, nor what steps would be taken under the powers conferred by the Act. He was sure, however, that, when farmers did know, they would be very satisfied with the course decided upon. He also asked the Minister to explain how the necessary funds were to be provided.

In reply, Mr. Deane said that, after the Bill had been passed by Parliament, and power for compulsory stamping-out was thereby given to the Government, the first step taken would be to call the people together in the districts affected by East Coast Fever and explain the provisions of the new law, especially with regard to the natives. Full explanation would be made ; and it would be pointed out to the farmers and the natives that the powers conferred upon the Government did not necessarily mean the wholesale wiping out of cattle.

In the removal of cattle the following process would be adopted. Where one or two days' trek from the farm to the nearest railway station was necessary, the animals would be temperatured before removal, and every day whilst on trek. All cattle with a normal temperature would be moved on, those with abnormal temperature would be slaughtered on the spot. If this process were carefully and thoroughly done there was no danger of their spreading the disease, even when passing through clean ground. The Government, Mr. Deane said, would be as fair as possible with regard to the schedule of prices. As regards the natives, it was well known how averse they were to having their cattle taken away, but, on the other hand, where the disease was rampant natives were now clamouring to have their cattle taken by the Government.

As to the cost involved in the proposed policy of stamping out, Mr. Deane considered that it would take £100,000 to deal with the disease on the lines suggested. The loss would be about 30 per cent. The cattle to be slaughtered, he continued, would be brought to the Government Abattoir and dealt with there, and arrangements would be made to sell the meat. No one but the Government would be allowed to remove cattle; and the Government would sell the meat and dispose of the hides and horns to the best advantage. With regard to the funds necessary, Mr. Deane reminded members that a Bill had been introduced last Session to provide for the raising of £200,000 for stamping out purposes. The

House did not, however, approve of the policy of stamping out, and the Bill was reduced by half. Mr. Deane anticipated that a Bill providing £100,000 for the purposes of the measure under consideration, would be introduced during the present Session.

Export of Ostriches.

A Bill "to prohibit the export of ostriches and ostrich eggs" has been introduced by Government and read a first time. The prohibition proposed will be unconditional except in the case of ostriches or ostrich eggs intended for export to any neighbouring Colony or State where similar legislation exists. The object of this Bill appears to be to bring Natal into line with the other South African States, some of which have passed Acts on the same lines. The effect of this legislation will be protective of the ostrich farming industry in South Africa; but the advantages directly derived by Natal will not be as great as in the case of Cape Colony, for instance, as ostrich farming in Natal occupies the attention of a very small number of our farmers.

Indian Question.

The Labour Party seems determined to leave no stone unturned to make it impossible—or even, if they can bring it about, unlawful—for trading on the part of Indians (including the class known as "Arabs"—who are, it may be mentioned, not Arabs at all, but Indians, they being Mohammedans, and so of a superior caste to that of the ordinary Indian, designated indiscriminately as "coolies"). Mr. Haggar was obliged to withdraw his Bill; and, having done so, moved two resolutions: first, "that, in the opinion of this House, the time has arrived when the Government should take steps to effectively restrict and ultimately to abolish Asiatic immigration into Natal;" and second, "that all Indians or other Asiatics who may arrive hereafter in Natal, under indentures made after December 31st, 1907, shall, on the expiration of such indentures, be repatriated."

Mr. Johnstone thereupon moved the following amendments: (1) "That, in the opinion of this House, it is desirable that, during the recess, the Government should enter into negotiations with the Government of India, through the Right Hon. the Secretary of State for the Colonies, for the purpose of making alterations with regard to Indian immigration, whereby immigrants should be repatriated at the expiration of their term of service;" and (2) "That the Government should also take into consideration the amendment of various laws affecting Indians at present in the Colony, with the view of encouraging the employment of such in the labour market, thus decreasing and making less necessary the importation of Indians." He pointed out the fact—a fact that appears to have quite escaped the notice of blind advocates of Indian repatriation—that the Indians were originally introduced into the country for the development of two of our greatest agricultural industries—the tea and sugar industries. He rightly contended that, if the importation of Asiatic labour were stopped, those industries would be instantly strangled.

The source of the whole difficulty lies, not in the fact that we are using indentured Indian labour, but in the fact that, when the Indian's term of indenture expires, we cannot force him to return to his country. Then the newly liberated Indian casts around for the most profitable occupation. Whatever he goes in for, he has one great advantage over the European: he can live on next to nothing, and he can live in the most squalid surroundings, so long as the rent does not make too large a hole in his income. Consequently he can undersell the European, and, not having, also, any of the expenses and losses that the European trader has to face, he can, at the same time, make a large profit. We must, for some years yet, import the labour we require for our sugar and tea plantations—until the conditions prevailing in the native labour market change—but at the same time the growing evil of Indian trading is calling for remedy. Therein lies the difficulty.

Mr. Johnstone's amendment was seconded by the Treasurer, and, on being put to the vote, was carried by 25 to 9.

A week later Mr. Haggar asked for leave to introduce a Bill to amend Act No. 17, 1895, entitled an "Act to amend the Indian Immigration Law, 1891." His motion was negatived. He then, on the following day, moved: "That, in the opinion of this House, the Government should introduce legislation providing that after a certain date, but not later than 31st December, 1912, it shall be unlawful to grant any licence to persons known as 'Asiatics,' 'Arabs,' or 'Arab Traders' in the Colony of Natal." A long discussion took place; and, finally, the motion, on being put, was lost, on a division, by 28 to 10.

Locust Destruction.

The subject of locusts has not, so far, occupied any part of the attention of members in our House. The Legislative Council of the Orange River Colony has, however, been engaged with the consideration of an important measure which the Government has introduced, framed chiefly on the results of the experience of Natal. The *O.R.C. Government Gazette* of the 9th August contained the promulgation of that Ordinance.

Under the provisions of the new Ordinance, every occupier of a farm on which locusts have deposited their eggs is compelled to give notice of the fact, in writing, to the nearest police post. The penalty imposed for failure to comply with this section of the law is a fine not exceeding £10, or imprisonment for a period not exceeding one month. It is provided that no occupier of a farm shall be exempt from the penalty imposed by reason of mere temporary absence from the farm at a time when such eggs were deposited.

Occupiers are also compelled to give immediate notification of the appearance on their land of any *voetgangers* (whether hatched thereon or otherwise), and must further use their "utmost endeavours" to destroy such *voetgangers*. The same penalty as before is imposed in the case of failure to comply with these provisions.

The individual who tries to evade his responsibilities by driving *voetgangers* from his farm on to his neighbour's land, has not been forgotten. He is not, however, liable to any penalty if, in the case of his growing crops being threatened by a swarm of *voetgangers*, he drives the locusts on to a neighbouring farm after having in vain attempted to destroy the swarm.

A Chief Locust Officer and subordinate locust officers are to be appointed. These officers will have power to enter on any farm on which *voetgangers* have appeared and take all such steps as they may deem necessary to destroy such locusts; and whilst carrying out such duty, locust officers are entitled to the free use of any water that may be required for the purposes of destruction, and also to free grazing and water for their animals—transport and otherwise.

In a case where an occupier fails to give the required notice of the appearance of *voetgangers* or to use his utmost endeavours to destroy such locusts, the cost of destruction by Government will be recoverable from the occupier; whilst in the case of a farm where there is no white person resident as occupier, or where the occupier is the manager, caretaker, or otherwise the servant of the owner, and has failed to give notice of the appearance of *voetgangers*, and has not used his best efforts to destroy them, the expenses incurred by the Government are recoverable from the owner himself.

In the same issue of the *Gazette* as that in which the Locust Destruction Ordinance is promulgated, appears notification of the re-appointment of Mr. Charles McG Johnston as Chief Locust Officer of the Orange River Colony for a further period of six months, from the 1st July, 1907.

Export of Mealies.

AN IMPORTANT MEETING.

QUESTION OF GRADING.

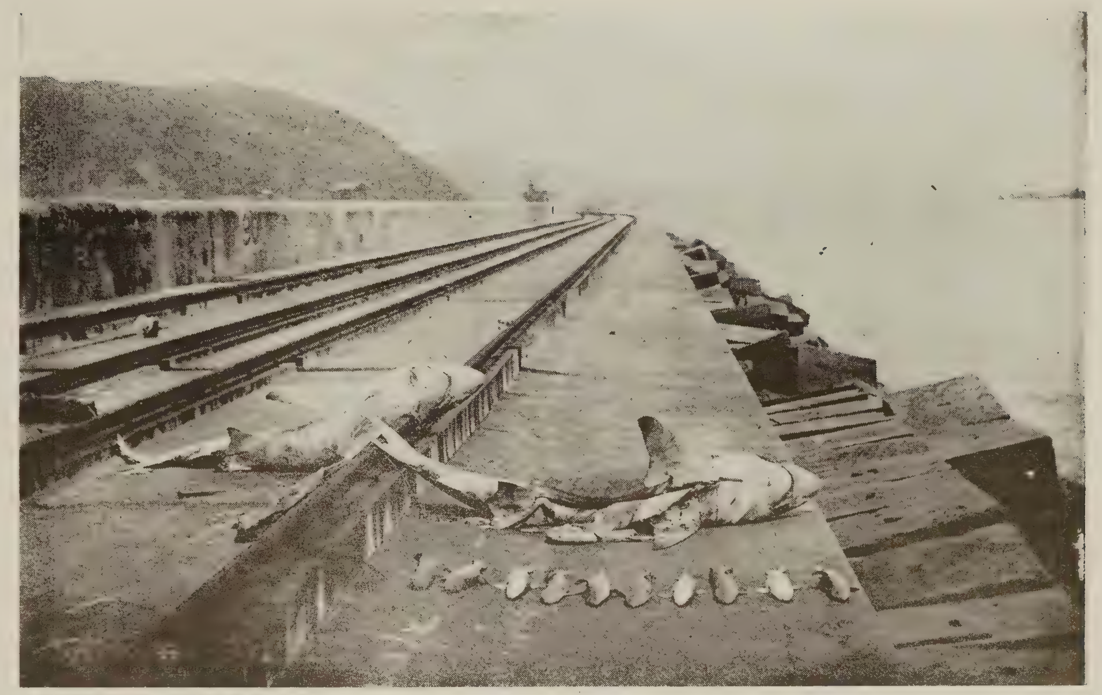
SATURDAY, August 3rd, was the occasion of an important meeting of persons interested in the export of mealies, in the office of the Prime Minister, called on the initiative of the Minister of Agriculture for the purpose of obtaining advice in connection with the proposed organised exportation of mealies. Representing the farming interest were Messrs. G. D. Alexander, J.P., and the Hon. T. Hyslop (representing the Mealie Growers' Union), J. A. Westbank and H. A. Light (representing Dalton Farmers' Association), J. Moon, J.P., and Baker (representing Camperdown Association), W. Pepworth (Klip River), Oldacre (Newcastle), and Lund. Messrs. Henderson (Chairman of the Durban Chamber of Commerce), A. G. May, De Waal Balwe and Hayne appeared on behalf of the mercantile industry; while the Government was represented by the Prime Minister, the Minister of Agriculture, and the Secretary to the Minister of Agriculture.

In opening the proceedings the Minister of Agriculture said the time was fast approaching when the work of exporting mealies should be undertaken. He took it for granted that they all knew what the Government had already done in connection with the organisation of an export of mealies. The first step would have to be the appointment of an inspector at the Port. Circular letters had been sent to the various farmers' associations of the Colony, and as a result about a dozen samples of mealies had been received. He now wished to have the advice of those present regarding those samples, which were before them: he wished to know whether mealies should be sent in one grade or in more than one. When that point had been settled the Government could go ahead and appoint their inspector.

The Prime Minister next spoke. He said the Government wanted the co-operation and assistance of both the merchants and the farmers. The Government had moved in the matter up to a certain stage, and it now felt that, without the co-operation of both the farmers and the mercantile community, any further advance on the part of the Government would be more or less futile. The Government hoped and believed that the merchants would give their assistance in dealing with the grain in Natal and on the London markets through the agencies and ramifications of their business connections. The farmers, in their turn, would be able to help them in respect of the production of the grain; and the

Government could do its part in seeing that the quality of the grain was up to sample. He understood that in the London market the grain was generally dealt with on samples. He had had forwarded to him, from one of the largest brokers, a sample showing the way in which grain was dealt with on the London market, and the utmost importance was attached to the bulk being true to the sample. He was informed that it was not of much consequence to the dealers whether good, bad or indifferent grain was sent so long as it was true to the sample—so long as the broker could say, "That is a sample representing so many bushels." There was a market for all kinds and descriptions of grain in London. He had advised that the brokers had their grain standardised from different parts of the world, and that these standards were recognised in the trade as representing grades number one, two and three, or whatever other classification might be adopted. It was of the utmost consequence that in developing what was one of the most promising export trades in South Africa their *bona-fides* should be unimpugned and above suspicion. It was in this respect that the Government could be of assistance if those present would formulate the conditions under which the grain should be exported. The Government had a large building at the port which might be used for the purposes of the export trade.

Mr. G. D. Alexander asked what were the Government's intentions with regard to the export of mealies. When it was first suggested that the Government should take part in the arrangements for the export of the grain, it seemed to him apparent that to do anything of the sort was entirely outside the Government's functions. He considered that it was a matter which should be undertaken by the farmers themselves: all that the Government should do should be to make the road for that export easy. With that view, and as a result of a resolution passed by the Natal Agricultural Union, an attempt had been made to establish a Mealie Growers' Union. From what the Minister of Agriculture said at the recent Conference, he understood that the Government was in sympathy with this movement, and was desirous that the farmers should take it up. The Mealie Growers' Union then sent circulars and copies of rules that had been drawn up all over the country. Very shortly afterwards the Minister of Agriculture called for samples of mealies, which action at once raised in the farmers' minds the question as to whether these mealies were to be exported through the Mealie Growers' Union or by the Government. Apparently on account of the fact that the Government was calling for the samples, farmers concluded that it was the Government which was going to do it. The consequence was that, from all the circular letters and copies of rules that were sent out, only two replies were received: and although there was a large number of enquiries, the farmers were hanging back, anxious to know if the Government was going to carry out the export and save them the £1 subscription



A LARGE HAUL OF SHARKS.

The above illustration represents a portion of a large catch made by Mr. J. J. Stephenson, of the Department of Agriculture. Two female sharks, each 7 ft. 6 in. long, were caught. In one of these were found ten young ones—shown in the foreground of the picture ; in the other were seven young ones, so that nineteen sharks may be said to have been caught with two throws.

and the commission which would be charged by the Union. Before anything further was done, he would like to know whether it was the intention of the Government to take up the export of mealies and act in the way the Mealie Growers' Union was going to act. The Government had made it impossible for the Mealie Growers' Union to go on.

The Prime Minister said that the Government had already made the road easy for the mealie growers. It had reduced the freight by nearly 50 per cent, and was offering all the information within its power. The samples received were indicative of what the farmers had done in response to the action of the Government. The presence of those gentlemen that day was an answer to Mr. Alexander. The Government was prepared to render help in whatever way it could. That was the very object they had in view in starting the movement, and he trusted the Government would have the co-operation of the farmers. Whatever had been done so far, had been done on the initiative of the Government. He himself did not know whether the crop this season was sufficiently large to admit of an export being undertaken. That point did not concern him much; but what did concern him was that, if they could send away grain and prove that it was possible to export it, they would have taken a step in the right direction, which would mean that in a few years they would have large quantities of stuff to send away.

The Colony, continued Mr. Moor, was capable of producing far more than it was doing at the present time, and it would produce more provided the farmers knew there was a market over the water. The first step was to prove that mealies could be produced at a price that would admit of a satisfactory overseas export; and, having proved that, they could then say to the people of South Africa, "Here is practically a limitless market for you," even although the present year's shipment was confined to a few thousand bags.

The Minister of Agriculture contended that the Government was clearing the way for the mealie growers, and not standing in their way. In estimating the production of mealies in the past, he had only taken account of the European crops. Applications, however, had been received from natives in the Thorn country asking for assistance to get their mealies to market. There had been an exceptionally favourable season in the Thorns, with the result that the native crops were far above the average.

Mr. Alexander explained that he had no wish to decry what the Government had done; but he wished to know clearly the Government's intentions regarding the future. He had stated again and again that the facilities given by the present Government for the export of mealies had done more in the interests of agriculture than all the experiment farms and agricultural settlements that had ever been brought into existence. In order, however, to carry out mealie exportation properly, it should be done by the farmers themselves through their Union. He repeated that the action of the Government in calling for samples had done a great deal of harm to the Mealie Growers' Union. He declared that he intended to resign his position as acting chairman of that Union because he felt it impossible to go on with the present arrangement, when the Government was to export the mealies and not the Mealie Growers' Union. As far as the question of mealies going out of the country was concerned, the Union undertook to deal with the crop not as an export crop, but in any way in which it could be sold to the best advantage, whether in the Transvaal or elsewhere. The action of the Government in lowering the rates and giving greater facilities was worthy of the greatest praise; but its action in stepping in now while the Union was in operation and existence virtually prevented the continuation of the Union. This was a great mistake.

Mr. W. Pepworth returned thanks to the Government for its action in the interests of mealie growers, and he expressed the opinion that, in doing so, he was voicing the views of the farmers in the Klip River Division. He suggested that the Government should provide facilities for storing the mealies at the port, and that it should aim at treating the mealies like coal, delivering them wholesale into the trucks and then into the ships, bagging them in London.

Mr. Moon regretted the attitude that Mr. Alexander had taken up.

Mr. Henderson said the Durban Chamber of Commerce were in sympathy with the endeavour to create an export trade in mealies.

Mr. May had no doubt that Natal could compete successfully with other countries, but he did not think that the mealies submitted that day were a fair average of the present year's crops. They were too good. He did not think it would be possible to fix any grades from the samples before them. It was better to follow the lines of other countries and have a large number of other grades, which would not necessarily complicate matters. Mr. May then explained some of the methods of grading adopted on the American markets. Whoever was going to do the sampling, he said, would have a hard task. He knew from experience even careful farmers would send different grade mealies in the same truck. He knew of no country exporting mealies which did not bulk them before or after export in order to grade them more satisfactorily. He asked whether the Government had taken into its consideration the question of weighing mealies in order that an official certificate might be given of the grade and weight, so that the farmer could be relieved from all responsibility as soon as the mealies were put on board.

The Prime Minister said that the Government was willing to do this; and he suggested that the meeting should appoint a sub-committee to go carefully into the matter of grading.

A sub-committee, as suggested, was appointed at the conclusion of the meeting, consisting of Messrs. Hayne, Light and May (representing the commercial community), and Messrs. J. G. Colenbrander, J. Moon and W. Pepworth (representing the farmers). A meeting to decide the matter of grading was arranged to be held in Durban on the following Thursday.

A discussion arose regarding the quality of the bags used for exportation purposes, and it was contended by the representatives of the commercial community that the bags should be at least 2½lbs. in weight. Mr. May said there was a law in force in Australia prohibiting the importation of bags under 2¾lbs., unless the weight was distinctly marked thereon.

It was pointed out that the farmers had already bought their sacks for this season, the majority of which weighed 2¼lbs., and therefore there was likely to be a big loss from leakages.

The question of the temporary storage of the mealies at one of the sheds at the port was discussed. It was pointed out that it would not be practicable to set apart a separate shed for the mealies, because of the uncertainty of where the ships would berth.

The Prime Minister said he would take into consideration the matter of arranging for vessels shipping mealies to berth opposite the shed where the mealies were stored, and thus save a double handling.

The Minister of Agriculture said that a charge of about one farthing a bag would have to be made to cover the cost of inspection and weighing at the port.

The following is a copy of a circular letter which has been sent by the Minister of Agriculture to the various Agricultural Associations of the Colony, regarding the matter of grading of mealies for export oversea:—

"Department of Agriculture, Pietermaritzburg,
20th August, 1907.

"Sir,—I have the honour to inform you that a meeting was held on the 3rd of August, which had been convened by the Government for the purpose of discussing the question of mealie export, and that, at the meeting in question, a sub-committee was appointed for the purpose of deciding upon the grades under which Natal mealies should be exported oversea.

"This committee has made the following recommendations regarding grading, which have been adopted by the Government:—

No. 1. White Flat Mealies.—Shall be sound, dry, plump, well-cleaned, and the grain nearly even in size. Occasional straw-coloured spots on the grain shall not deprive it of its grade.

No. 2. White Mealies (Flat Variety).—Shall be sound, dry, and reasonably clean, but an occasional yellow or discoloured berry shall not deprive it of its grade.

No. 3. White Mealies (Flat Variety).—Shall be dry. Berries may be of irregular size and shape, and a reasonable quantity, not exceeding 12½ per cent., may be yellow or discoloured berries.

No. 1. White Coast Mealies.—Shall be bright, dry, sound, and well-cleaned. May be round, or round and flat mixed. An occasional coloured berry shall not deprive it of its grade.

No. 2. Mixed Mealies.—Shall be dry, sound, and reasonably clean. May be round, or a mixture of round and flat. Chiefly white, but may contain up to 25 per cent. of yellow or blue berries.

No. 3. Mixed Mealies.—Shall be dry. May be round, flat, or a mixture of both; chiefly yellow and white. A reasonable percentage of blue berries allowed.

No. 1. Yellow Flat Mealies.—Shall be bright, sound, dry, plump, and well-cleaned.

No. 2. Yellow Flat Mealies.—Shall be sound, dry, reasonably clean. An occasional white, red or faulty berry shall not deprive it of its grade.

No. 1. Yellow Round Mealies.—Shall be bright, sound, dry, plump, and well-cleaned.

No. 2. Yellow Round Mealies.—Shall be sound, dry, and reasonably clean. An occasional white, red or faulty berry shall not deprive it of its grade.

No. 3. Mixed Yellow Mealies.—Shall be dry, may be round, flat or a mixture of both.

"Should you wish to export mealies and to avail yourself of the grading system under which the mealies are to be sold to arrive on samples previously sent Home to England, it will be necessary for you to notify me of the quantity you intend to export and of the probable date of the arrival of the consignment in Durban.

"The mealies must be graded in Durban from an inspection of the consignment by Mr. J. A. Westbrook, who has been appointed by the Government; and you will be notified as soon as possible of the grade under which they have been so classified by the Government Inspector. The bills of lading will be duly endorsed with the grade, and arrangements will also be made for the mealies to be weighed, and the weight of the consignment endorsed on the shipping documents. A small charge will be made for the inspection and the weighing. Arrangements must be made by the shippers themselves for the insurance of the consignment.

"The mealies can, if required, be consigned to the Agent-General in London, who will sell them to the best advantage, and the money so realised will be cabled out to Natal by the Natal Bank free of expense to the consignor.

"The samples of the various grades are being forwarded to the Agent-General in London, and it is intended to cable to the Agent-General as each shipment leaves the Port notifying him of the numbers of the bags and grades so that the consignments can be sold before arrival. If this course be not followed the mealies will have to take their chance on arrival in London, and extra expenses will be incurred in connection with handling and warehousing.

"The following figures represent railway carriage, freight, banking charges, and all other incidental items of expenditure, including commission on sale in the Home market:—

Freight From—	Per Ton.			Per Muid. (200 lbs.)	
	£	s.	d.	s.	d.
Ladysmith to London	1	3	6	2	2
Newcastle to London	1	6	9	2	6
Dundee to London	1	5	6	2	4
Estcourt to London	1	1	8	2	0
Greytown to London	1	1	3	1	11½
Richmond to London	1	0	6	1	10½
Creighton to London	1	2	6	2	1
Dalton to London	1	0	6	1	10½
Maritzburg to London (including cartage)	1	1	2	2	0½
Verulam to London	1	0	6	1	10½
Tugela to London	1	0	6	1	10½
North Shepstone to London	1	0	6	1	10½
Umzinto to London	1	0	6	1	10½

"The prices which have been realised for American and European mealies on the English markets during the last six months average from 21s. 6d. to 26s. 6d. per quarter of 480 lbs., according to the season and to the quality of the grain.

"It should be seen that the full 203 lbs. of mealies are placed in sound bags, which must be well sown with double twine and made secure. Each bag sent forward for export must be clearly marked with the exporter's private mark.

"As this is the initial stage in the export of Natal mealies, it is imperative that each exporter supplies mealies of uniform quality and of proper weight, otherwise our mealies will obtain a bad name on the Home markets, and the endeavours of the Government to establish the export trade will prove ineffective."

TESTING OF EQUINES FOR TRANSVAAL.—It is notified in the *Government Gazette* that, in connection with the testing with mallein of equines proceeding to the Transvaal, the following charges are to be enforced:—For each animal tested, up to six animals, a charge of 5s. a head, which charge is to include mallein; and for each additional animal above six a charge of 2s. 6d. per head, which charge is to include mallein. It is required that these fees shall be paid in cash before the issue of the necessary certificate is made.

Tabakscultuur in Zuid Afrika.

MET SPECIALE TOEPASSING OP NATAL.

Door E. R. Sawer, Directeur, Proef Stations.

De uitspraak van bevoegde beoordeelaars over Zuid Afrikaansche tabak vertoond op de recente Tentoonstelling in Londen werd verbeid als een gunstig aanvangspunt voor de discussie van middelen berekend om het Natalsch gegroeid tabaksblad in een gunstige positie te plaatsen op de plaatselijke en buiten markten. En hieruit blijkt ongetwijfeld dat geen poging achterwege gelaten kan worden als verloren tijd ingehaald en onze nijverheid op gelijke voet met die van de aangrenzende Kolonies gebracht moet worden, wier produkten reeds de gunstige aandacht in de voornaamste centra van gebruik trekken.

Het volgende overzicht, gepubliceerd door het Koloniale kwartaalsche blad *Tobacco*, dient als een nuttige vingerwijzing tot de vergelijkelijke vooruitgang in verschillende deelen van Zuid Afrika, en de noodzakelijkheid voor een radikale wijziging van ons eigen stelsel:—

"Tijdens de Tentoonstelling werden monsters van bladeren verkocht en de meening van velen van het publiek was dat de goederen, hetzij sigaretten of tabak, als goed verklaard werden, hoewel heel anders van smaak dan de gewone rook materialen. De sigaren waren niet heelemaal een succes, en het kweeken van een geurig blad, dat effen brandt, eenigszins geschikt voor het maken van beste sigaren schijnt tamelijk ver in het verschiet te leggen. De sigaretten van Rhodesia, Transvaal en Kaapkolonie waren de beste bewijzen van de gemaakte vordering in de nijverheid in Zuid Afrika, terwijl de vele uitmuntende tabakken voor pijpgebruik van verschillende sterkheid en fijnheid van snede algemeen bewonderd werden.

"Een ommekijk naar de vertooningen ving aan met de Transvaal—de eerste thuisplek van de 'Boer' tabak. Hier sloot de verscheidenheid in: sigaretten, tabak—gekerfd, in de rol en in het blad, van den heer Van Erkom, Pretoria en Johannesburg. Deze firma heeft gronden in Magaliesberg en hier is het waar deze welbekende tabakssoorten groeien. Een ander treffend vertooning was die van het Transvaalsche Gouvernement uit Zoutpansberg, dat zijn 'Lataba' handelsmerk tabak en sigaren vertoonde. Er waren sigaretten van twee en tabak van vier of vijf soorten. Sigaren en het tabaksblad werden ook vertoond, zoomede snuif. Het vennootschap Jack, Bepkt., van Johannesburg vertoonde eenige monsters van hun 'Crocodile' handelsmerk, uit Magaliesberg tabak.

Een speciale roem van het vennootschap De Jager & Co., Kerk Straat West, Pretoria, dat een belangwekkend vertooning van goederen had, is dat geen chemicalien of geurgevende middeltjes van welke soort ook aangewend worden, een feit dat ten gunste van vele andere vertoond ook bewezen kon worden. Tabak, opgedraaid en in fantastische fatsoenen geperst, werd vertoond door den heer Victor Roodekloof· De heeren G. Bourdos & Co. leverden goede resultaten uit Turksche zaadsoorten, de sigaretten behalende 5s per 100.

"Omtrent vijf Natalsche firma's hadden vertooningen. De heer W. Starr, van Verulam, vertoonde eenige seroeten die er goed uitzagen. W. Starr fabriceert van tabak door hemzelven gegroeid en bewerkt ook andere tabak. Men kan hem beschouwen als een der meest gevorderde pioniers van de Zuid Afrikaansche nijverheid. De heeren Chetty & Co., van Durban, hadden ook eenige sigaren ten toon. The Tobacco Planters, Bepkt., en de heeren Freerks & Co., hadden ook tabak—in het blad en gekerfd.

"De Oranje Rivier Kolonie nijverheid werd vertegenwoordigd door de firma van de heeren Alexander Wright & Co., van Vredefort, wier roltabak aangevuld was door gekerfd tabak, fijn, medium en grof gesneden, om alle smaken tevreden te stellen. De heer B. Pretorius, van Welgerust, vertoonde ook wat van de eigenaardige gedraaide tabak, waarin de omslag betstaat uit het heele blad, de grove stengels ingesloten, hetgeen deze Zuid Afrikaansche rol en gedraaide tabak een vreemdsoortig 'touwachtig' voorkomen geeft.

"De heer H. W. J. van der Veen, van Oudtshoorn, en de heer John C. Raubenheimer, van Seymour, waren onder de vertooners uit de Kaapkolonie. Eenige sigaretten van Turksche zaad gegroeid in het Paarlsch distrikt maakten een goed monster uit. Sommige dezer onder den handelsmerk naam van 'Aroma' werden gemaakt door de 'Court Cigarette and Tobacco Factory,' van Port Elizabeth, en werden verkrocht tegen 6d per pakje van 10, en enkelen werden weggegeven als monsters. De heer van Wijk, van Fairbairn, had een mooie uitstalling. De heer J. H. Voogt, van Seymour, vertoonde pijp tabak in pakjes en losse gekerfde tabak, aantoonende verder hoe goede mengsels gemaakt kunnen worden door het gebruik van verschillende soorten. Het district Ladismith, in de Kaapkolonie, is bekend voor de Kalabas pijpen, waarvan er een mooie uit-talling van den heer H. Boide was.

"De Rhodesische afdeeling triomfeerde met hare 'Turksche' sigaretten en een prachtige vertooning van Bright Virginia van de 'South African Plantations, Ltd.' De sigaretten van de fabriek Gebroeders Barker, Bulawayo, waren voorbeelden van nette verpakking en zorgvuldige bereiding van geurige en goed brandende tabak. Een goede vertooning van het Turksch-Rhodesische blad werd opgemerkt—van het beste gegroeid door den heer S. Briggs, van Mazoe, Zuid Rhodesia. Ook was er tabak voor sigaren te Melsetter gegroeid, en de heer L. Black, van Salisbury, werd ook vertegenwoordigd."

Meer beredeneerd, en derhalve om die reden meer belangrijk, is het rapport van den beoordeelaar, den heer Freeman, wiens opinie van gewicht is omdat hij een practische fabrikant is:—

"De tabak gegroeid in Natal was ruw, dik, grof, en zou geheel ongeschikt zijn voor de Europeesche markt. Het scheen of men het te geil liet groeien en de middel rib moet minstens 30 per cent. van het geheele gewicht uitgemaakt hebben. De aders waren betrekkelijk even dik en om die reden zou de tabak ongeschikt zijn voor een binder—het eenige mogelijke doel waarvoor het gebruikt kon worden.

"Men moet in het geheugen houden dat de tabaksoorten vereischt voor sigaar, sigaretten maken, of pijp doeleinden sijn alle absoluut verschillend.

"De atmosferische toestanden, de grondsoort, de bebouwing of behandeling zijn voor elke klasse geheel afzonderlijk en vereischen de diensten van speciale deskundigen die raad moeten geven en alles overzien. Zoodanige deskundigen kan men slechts bekomen door ze hooge salarissen te betalen, doch de onkosten kunnen gedeeld worden in een district of Kolonie, en voor hunne diensten *pro rata* betaald worden.

"In ieder geval als tabak met goed gevolg gegroeid zal worden, moet men afzien van de ruwe methoden van 200 jaren geleden en de hedendaagsche en wetenschappelijke cultuur van succesvolle concurrenten navolgen.

"Ik ben overtuigd dat eenige zorg besteed aan de behouwing ruimschoots beloond zal worden, en dat als Zuid Afrika er in slaagt (en er bestaat alle redenen voor de meening dat het zulks wel kan) om tabaksoorten op te leveren die in eenige der boven vermelde vereischten voorziening zullen maken, is het gewis dat mijne fabrikanten alhier zullen die met genoegen verwelkomen en hunne landgenooten een vol aandeel van de profijt van wege deze cultuur zullen geven, die thans zoo te zeggen geheel door den vreemde in pacht is. . Als de natuurlijke markt voor Zuid Afrikaansche produkten het Moederland is, dan moeten hare vereischten goed begrepen worden. De rauwe produkten, die tot gemeld land uit de Kolonies komen, behooren te kunnen concurreeren met de vreemde, zelfs wanneer zij niet beter kunnen zijn. Zuid Afrikaansche tabak doet dit niet. Meer zorg en stelselmatigheid zijn noodig. Groeien en bewerken op goed geluk af zullen natuurlijk nooit beantwoorden. Er zijn nu teekenen, echter, dat de geheele manier van Zuid Afrikaansche cultuur voordeelig verandert. Het advies der deskundigen wordt toegepast en het uitgeven van zaad onder toezicht van de Gouvernementen heeft een goed effekt gehad. Tot nog toe wat er gedaan is met goed gevolg, is in pijp tabak waarneembaar en in meer recente tijden in sigaretten 'Turksch' bladtabak. Sigaar bladtabak van goede kwaliteit is nog niet geproduceerd in de Zuid Afrikaansche Kolonies. Deze is nog de minst gevorderde van alle soorten cultuurproefnemingen. Doch tijd en zorg zullen wonderen verrichten."

Met het doel om een tweede opinie in het laatste verband te verkrijgen werd een uitgekozen kistje sigaren gestuurd naar den Besturenden Directeur van de "United Tobacco Companies," Kaapstad, die sedert jaren een der grootste afnemers van blad tabak op de Londensche markt was. Zijn rapport leest als volgt, nl dat: "de tabak een groote verbetering is op de gewone Natalsche seroet, maar zij laten nog veel te wenschen over, vooral wat betreft de smaak. De twee groote punten ten gunste daarvan thans zijn, ten eerste dat de tabak goed brandt (hetgeen een eigenaardigheid van alle Zuid Afrikaansche tabaksoorten schijnt, *met uitzondering van het Natalsche blad dat aan de kust groeit*), en ten tweede dat zij niet sterk zijn. Zij missen, echter, geur en hebben een soort van grond-smaak, niet veel anders dan die opgemerkt in de mindere klassen van Brazilianen. Ik meen dat er meer aandacht gewijd moet worden aan het fermenteeren (zweeten) van het blad want hiervan hangt de uiteindelijke smaak der tabak af bij de bewerking.

"Ik ben blijde te vernemen dat gij begonnen zijt met proefnemingen met drogen in schoorsteenen en ik meen gewis dat alle tabak, in schoorsteenen gedroogd, voor geruimen tijd een goede markt zal hebben. Iets over een jaar geleden had ik het genoegen uwen Landbouw Directeur te Pietermaritzburg een bezoek te brengen, en ik had toen een gesprek met hem over de mogelijkheid om de Natalsche tabak te verbeteren, en bij die gelegenheid vernam ik, voor de eerste maal, van de Weenen Besproeiings Nederzetting en de mogelijkheden van tabakscultuur aldaar en ik wensch u alle succes toe met de proefnemingen. Zooals ik begrijp zijn de plaatsjes alle dicht op elkaar en men moet de tabak op een middenpunt behandelen."

Schrijver dezes wil geen onnoodig donker prent afschilderen omtrent den tegenwoordigen toestand van de tabak cultuur, doch een duidelijke erkenning van de tekortkomingen in bovengeschreven getuigenis bloot gelegd is een essentieel voorafgaande vereischte tot hare verwijdering. Geen nuttig doel kan bereikt worden door feiten over het hoofd te zien of ze weg te laten wanneer zij in een vriendschappelijke critiek aangehaald worden, die liever tot ons dadelijk voordeel geexploiteerd moeten worden. Gedurende het jaar 1905 heeft Natal uit het Vereenigd Rijk aan tabak alleen ter waarde van £64,590 ingevoerd, terwijl er slechts ter waarde van £660 alles te zamen uitgevoerd werd. One onmiddellijk doel, derhalve, is om een punt te zetten aan een tijdperk van stilstand en verkeerde pogingen door de discussie en practische demonstratie van verbeterde en goedgekeurde stelsels van cultivatie, droogmaken en fabriceeren, en in dit verband kan men geheel vertrouwen op de hartelijke samenwerking van allen die belang stellen in dezen belangrijken tak van den landbouw.

Een middel is reeds aan de hand gegeven, namelijk tabak fabrieken, doch een bezoek van de plantages in verschillende districten bevestigt de meening der Londensche critici. De fabriek is de laatste schakel in den ketting van organisatie en een eerste en dringende vereischte is de wijziging en verbetering van de eerste stappen tot: bebouwing en droogmaken; het gebruik van het beste, verkrijgbare zaad; de zorgvuldige keus van localiteit en grond voor specifieke typen tabak; het aanwenden van geschikte mestsoorten; en de oprichting van behoorlijke schuren tot droogmaken. Het Sumatra blad, zooals van het veld genomen, is meer dan eens gebleken geenszins van mindere waarde te zijn wat weefsel en overeenkomst betreft dan de tabak voor omhulsel doeleinden door groeiers ingevoerd, maar werd naderhand geschaad in de behandeling wegens het gemis aan geschikte gebouwen. De open gras-schuiling, stal, of kraal is geen geschikt gebouw voor dit doel, en geen werkelijken vooruitgang kan verwacht worden zoolang de behandeling beschouwd wordt als slechts een proces van droogmaken. Het reguleeren van temperatuur en atmosferische vocht is noodwenig tot behoorlijk beheer van de veranderingen die plaats vinden in het blad gedurende dit tijdperk, en zoodanige regulatie kan slechts te weeg gebracht worden door middel van behoorlijk uitgedachte schuren.

DE KEUS VAN LOCALITEIT.

Eigenlijke proefnemingen te velde kunnen alleen belissen of een gegeven localiteit al de condities opleveren die vereischt zijn voor een specifieke type tabak, maar aanvankelijk denke men aan een regel van algemeene toepassing nl., dat goede rook tabak niet geproduceerd kan worden binnen een zekere distantie van de zee-kust. Het "branden" van tabak wordt schadelijk aangedaan door de aanwezigheid van chloor in de lucht en grond, en tengevolge worden plantages in Cuba, Sumatra en de Philippijnen, oppervlakten die ideale condities hebben voor deze cultuur, niet aangetroffen binnen tien mijlen van af de zee. Goede brandende hoedanigheden zijn kenmerkend in het Zuid Afrikaansche blad, een enkele uitzondering, als te voren gemelde zijnde de tabak gegroeid in de Natalsche kust streek. Aan de andere hand schijnen de warme, geschuilde valleien, gelegen van tien tot vijftig mijlen van de kust, en een ruimen regenval genietende, zooals die reeds geexploiteerd te Mid-Illovo, Verulam, Chaka's Kraal, en Eshowe en andere districten van Zululand, de best verkrijgbare plekken op te leveren voor het daarstellen van sigaren-blad plantages, terwijl zekere middellandsche en hooger gelegen districten zooals Weenen, Vrijheid en Paulpietersburg een benijdenswaardige plaatselijke reputatie verkregen hebben voor pijp tabak, die nog hooger aangeschreven zal worden door betere faciliteiten voor het droogmaken en de behandeling aan te wenden. Weinig aandacht is tot nog toe gewijd aan de bebouwing van sigaretten typen, maar onderworpen aan toekomstige verbetering schijnen de resultaten van een proef gewas te Weenen aan te duiden dat dit district ten minste een geschikte centrum is voor de organisatie van uitgebreide operaties. De localisatie van typen brengt vele voordeelen mede, want gebouwen en machinerie kunnen moeielijk schikbaar gemaakt worden tot behandeling van een gemengd gewas, en de kanzen van een planter op succes zijn veel beter wanneer de aandacht gewijd wordt aan de vereischten en eigenaardigheden van een enkel soort blad. Een reputatie wordt, gelykerwijs, meer gemakkelijk gevestigd door een persoon of district voor een enkele soort goederen dan voor allerhande goederen, en een beter markt kan verkregen worden voor groote perceelen van eengalig gehalte dan voor een antal kleine en afwijkende bezendingen.

DE KEUS VAN GROND.

De bestaande aanvraag in Zuid Afrika is en voor een lichter kleur en voor een minder sterk soort pijp tabak, die de vrij-brandende hoedanigheden en de kenmerkende smaak van Boer tabak zal behouden, en voor groote hoeveelheden goede Turksche en Bright Virginiaansche sigaretten blad tabak. Een markt voor deze typen bestaat reeds en het is in 't oog loopend dat het in 't voordeel is van den planter om zich aan den drang van de omstandigheden over te geven liever dan te probeeren den verbruiker producten op te dringen waarvoor de aanvraag nog in het leven geroepen moet worden. In de afwezigheid van een goedkoope en goede substituut, heeft zware, grove pijp tabak in het verleden een min of meer bevredigende prijs opgebracht, maar het kan nimmer op gelijke voet concurreeren tegen de superieure tabak. Hoe rijker de grond, hoe zwaarder en geiler de tabak; hoe zwaarder de tabak, des te grover is het en hoe minder per pond zal het opbrengen. Om een deel van het gewicht van den oogst te verliezen en diens markt waarde te verdubbelen is ware huishoudkunde, en de tabaksoorten thans in Zuid Afrika geproduceerd die de hoogste prijzen behalen zijn bijna algemeen gegroeid in zand gronden of zandkleien met behulp van mestsoorten. Geen methode van drogen of fermenteeren (zweeten) zal het effekt van een zwaren grond op de kleur van het blad tegenwarken. De lichtgele kleur van Bright Virginia tabak, en de rijke gouden kleur van het beste Turksche blad zijn oorspronkelijk te wijten aan den grond waarin de planten gegroeid worden, en worden alleen ontwikkeld door de latere behandeling. Een warme zanderige kleigrond, goed gedraineerd, rijk, diep en kalkhoudend, is 't geschikst voor bijna alle soorten tabak. Hoe meer zanderig, tot op een zekere hoogte, de grond is, des te beter zal de kwaliteit van de tabak zijn; hoe meer kleiachtig de grond is, hoe minder van kwaliteit zal de oogst zijn, hoewel het gewicht bevredigend zijn zal. Op geen gewas is de uitwerking van staande water zoo merkbaar als op tabak en geen gewas wordt zoo min benadeeld door droog weer. Goede natuurlijke of kunstmatige draineering is derhalve essentieel tot bevredigende resultaten. Een geschuilde positie is ook van het hoogste belang en bescherming tegen den wind moet verzekerd worden, zoo noodig, door boomen aan te planten of zelfs door rijen mielies in het plantage aan te brengen.

Alle soorten tabak zijn ten zeerste vatbaar voor verandering van lokaliteit, en als verscheidene ingevoerde varieteiten voor een reeks jaren gegroeid worden van plaatselijk gewonnen zaad zullen zij uiteindelijk gemeenschappelijke kenmerken aannemen, geput uit den grond en de klimaat, en hunne oorspronkelijke afzonderlijke eigenaardigheden verliezen. De resultaten van zulk een proces kunnen waargenomen worden in de zoogenaamde Natalsche tabak die een product is van verscheidene afzonderlijke sigaar tabaksoorten, en een voorbeeld van de ontaarding die binnen een paar jaren plaats kan hebben. Het is raadzaam dikwijls in te voeren van de localiteit waar de bijzondere tabak hare hoogste voortreffelijkheid bereikt en daardoor de kwaliteit waarvoor het beroemd is te verzekeren. Zulk een stelsel is nu in zwang in al de oudere tabakgroeiende landen, en een wereld-wijde handel wordt gedaan in Cubaansch zaad uit het district Vuella Abajo. In opvolging van deze politiek zijn voorraden als hieronder vermeld verkregen om aan planters tegen kostprijs te verschaffen en, het is te hopen, een eerste hinderpaal tot vooruitgang is daardoor verwijderd. Tabak wordt geklassificeerd volgens de aanwending daarvan, hetgeen kan zijn als sigaar vuller of omhulsel, sigaretten tabak, voor de pijp, koek, pruimen, enz., en in elke klas worden een grooter of kleiner aantal verscheidenheden aangetroffen, gegroeid voor het speciale doel in verschillende localiteiten. Hiervan is eene kleine lijst opgesteld, gegrond op de ondervinding van de planters in de verschillende Kolonies van Zuid Afrika, hoewel verder wijziging waarschijnlijk noodig zal zijn voor een bepaalde keus van standaard typen voor Natal gemaakt kan worden.

KEUS VAN SOORTEN.

Succes in het planten van tabak moet grootelijks afhangen van de zorgvuldige consideratie van klimaat, grondsoorten en markten, waarna het een zaak voor de groeier is om proeven met zoodanige typen te nemen als blijken de best te zijn onder soortgelijke omstandigheden elders. Over het algemeen wordt een grooter warmte vereischt voor de productie van geurige tabaksoorten die geschikt zijn voor sigaarvulling; de grootste hoeveelheid van de wereld voorraad pijp en sigaretten tabak wordt gegroeid in de warmere gedeelte van de gematigde luchtstreek, terwijl de koeler streken dunne bladeren met weinig aroma opleveren, doch geschikt voor sigaren omhulsels. De lichtste aarde begunstigt den groei van sigaretten en lichte pijp tabak, zwaardere grondsoorten worden gezocht voor donkere pijp tabak en pruim tabak, terwijl de rijkst mogelijke zanderige kleisoorten wenschelijk zijn voor de productie van tabak voor sigaarvulling. In alle gevallen moet, echter, te veel klei vermeden worden. De volgende classificatie en korte beschrijvingen kunnen een weinig hulp bieden in de kwestie van keus:

Tabak voor Sigaren.

Cubaansche.
Zimmer Spaansche.
Sumatra.
Connecticut.
Havana.
Braziliaansche.

Sigaretten Tabak..

Turksche (Aromatisch, Cavalla, Smyrna, Samsam, Bafra).
Bright Virginiaansche—Geel Orinoko.

Lichte Pijp-tabak (voor schoorsteen drogen).

Hester.
Goldfinder.
Conqueror.
Warne.
Bullion.

Donkere Pijp-tabak (voor lucht drogen).

Honduras.
Burley.
Medley Pryor.

Cubaansche.—Levert een klein blad, maar als het van ingevoerd zaad gegroeid wordt, behoudt het veel van de aroma (geur) van Cubagegroeid tabak. Het wordt gebruikt voor de fijnste sigaren, beide voor vulling en omhulsels.

Zimmer Spaansche.—Levert een middelmatig blad van donkere kleur en zeer geurig. Gebruikt voor gewone sigaren als vulsel en geeft een zwaren oogst per akker.

Sumatra.—Levert een heel dun blad van fijn weefsel en kleine aderen. Behoort gegroeid te worden voor sigaren omhulsels, onder bescherming van doek of latten indien mogelijk.

Connecticut.—Levert een heel breed, fijn blad, sterk, zijdachtig en veerkrachtig met kleine vezels. Geschikt voor omhulsel of vulling.

Havana.—Zeer dun, fijn blad van keurig smaak. Gebruikt voor omhulsel of vulling.

Braziliaansch.—Levert een grover, zwaarder tabak dan voorgemelde. Gebruikt voor goedkoopere sigaren of om met de betere soorten te mengen.

Turksche.—Een heel duidelijk type van tabak, waarschijnlijk herkomstig uit Zuid Amerika. In Turkije wordt het algemeen in de zon gedroogd maar in Zuid Afrika is het met goed gevolg in schoorsteenen gedroogd.

Licht Virginiaansch.—Verschillende typen worden gegroeid. Bladeren lichtgekleurd en van keurige smaak. Wanneer in schoorsteenen gedroogd is de kleur van de tabak van lichtgeel tot lichtbruin.

Hester.—Levert een breed hartvormig blad, fijne vezels en zijdachtig. Schoorsteen gedroogd is de tabak voor pijp gebruik zeer helder geel of bruin.

Goldfinder.—Een gelijksoortige heldere tabak als voorgaande voor cultuur in zanderige grond.

Warne.—Een zeer populair soort voor de productie van geel schoorsteen-gedroogde tabak.

Bullion.—Een Witte Burley Kruisteelt met Hester, breede blaren van fijn weefsel. Levert een weinig zwaarder, geel tot bruin, pijp tabak bij schoorsteen droging.

Honduras.—Een krachtige plant en een der beste voor bruin pijp tabak van middelmatige sterkte.

Burley.—Levert een lang, nauw blad, wit van aanschijn zoolang het groeit. Geschikt voor rijke kalksteen grond en de productie van een zwaren oogst van pijp tabak van volle smaak.

Medley Pryor.—Levert een heel breed, zacht, zijdachtig blad, met taaie vezels. Behoort gegroeid te worden in rijke zware gronden voor de productie van donkere pijp tabak van volle smaak.

BEREIDING VAN DE ZAADBEDDING.

De meeste mislukkingen in tabak planten onstaan in de zaadbedding en een zorgvuldige studie van de gevaren waaraan de plantjes bloot staan behoort gemaakt te worden. De ontkieming is ietwat lang en dikwijls duurt het een maand en zelfs zes weken voor de plantjes boven den grond verschijnen. Deze eigenaardigheid is van belang tengevolge van het feit dat zelfs het zorgvuldigste hand-wieden stoort de tabak worteltjes en verzwakt de planten buitengewoon veel. Iedere poging behoort derhalve aangewend te worden om eene bedding te verzekeren die van den aanvang af vrij is van onkruidzaadjes. Dit behoort zoo vroeg mogelijk in den winter bereid te worden, een rijk zanderige klei wordende uitgezocht in een geschuilde positie. Na de bedding afgestoken is, die geen vier voet in de breedte te boven moet gaan, moet men kreupelhout en brandhout op de oppervlakte pakken in voldoende hoeveelheid om een sterk vuur voor minstens een uur aan te houden. Dit zal beide de onkruidzaden en insekten eiers die aanwezig kunnen zijn vernietigen en daarenboven een belangrijk meststof voor de planten opleveren. Zoolang de asch nog warm is moet de bedding ter dege omgespit worden, zoo diep mogelijk, en de oppervlakte heel fijn geharkt worden. Alles wat den groei der planten mag hinderen, of hare latere verwijdering, moet zorgvuldig weggenomen worden en de grond zoo fijn mogelijk gemaakt worden. Daarna moet men het zaad mengen met honderdmaal deszelfs gewicht met asch of fijn, droge grond en zaaien in de evenredigheid van een ons op een honderd vierkante yards van de zaadbedding. Indien zordvuldig aangewend zal een vingerhoed vol zaad van de pijp tabak soorten genoeg zijn om een akker tabak te planten, hoewel tien maal zooveel planten noodig zijn om een gelijke oppervlakte met Turksch tabak te bedekken waarvoor een dichtere aanplanting gevolgd wordt. Een lichte roller over de bedding getrokken zal voldoende dekking aan de zaadjes geven, die onder geen omstandigheden diep gezaaid moeten worden. De oppervlakte behoort nu nat gemaakt te worden met zwakke mestwater, bereid door 10 pond hoendermest in 12 gallon water op te lossen, en licht bedekt met stroo. Een dubbel koers steenen behooren dan om den kant der beddingen gelegd te worden, waarop geplaatst worden hessische of servische bedekte ramen tot bescherming van de plantjes tegen de koude, hitte en insekten aanvallen. Te veel nadruk kan niet gelegd worden op de noodzakelijkheid voōr deze voorzorg. Men behoort met tusschenpoozen van een week te zaaien, om een voorraad plantjes te hebben tot verplanting wanneer het weder gunstig is om ze tot de plantages over te brengen. Het is vergeefsch om datums vooraf voor dit doel vast te stellen daar de planter door de alsdan heerschende omstandigheden geleid moet worden. De planten in de zaadbedding moeten altijd genoeg nattigheid hebben en men moet zorgen dat zij steeds krachtic groeien. Als de regenval onvoldoende is, moeten zij bewaterd worden met een zwakke vloeimest zoo dikwijls noodig. Indien onkruid opkomt ten spijte van de voorgemelde voorzorgen, moeten zij met de hand met de grootste zorg verwijderd worden. Dikwijls zal het gebeuren dat zelfs het zorgvuldigste zaaien een te dikke bedding ten gevolge heeft, in welk geval de planten uitgedund moeten worden door een hark over ze heen te trekken.

(*Wordt vervolgd.*)

Grooming a horse answers two ends. It removes from the skin those particles of perspiration, dust and dirt which would otherwise impede and clog the free action of the sweat and oil glands. Then it removes the scurf or worn-out cells which are no longer required on the surface of the skin, and which would, especially when cemented together by particles of sweat, add to the obstruction of the glands.

Killing Fruit-Fly.—In a report to the Under Secretary for Agriculture, Western Australia, the Chief Inspector under the Insect Pests Act (Mr. T. Hooper) states that, in combating the ravages of the fruit-fly, he carried out a series of trials for the purpose of finding out the best means of killing them. The materials used were kerosene, turpentine, benzine, and naphtha, placed in tins and scattered about the orchard, where they were allowed to remain for twenty-four hours; at the expiry of this time the tins were examined with the following results:—Turpentine: 6 tins used, 2 flies found in one, all the rest empty and dry. Benzine: 8 tins used, 1 fly in one and 4 in another, all tins dry. Naphtha: 4 tins used, no flies caught, all tins dry. Kerosene: 6 tins used, 149 flies caught (every tin containing some), all tins moist.

Oost Kust Korts.

BENOEMING VAN ADVISEERENDE COMMISSIES.

De volgende regulaties voor de benoeming van Adviseerende Commissies onder de Oost Kust Koorts Akte, 1906, zijn door Zijne Excellentie den Gouverneur in Rade goedgekeurd:—

1. In elke Magistraat's Afdeeling een besmet area verklaard in termen van Sectie 3 van Akte No. 54, 1906, zal er eene Commissie bestaande uit acht leden benoemd worden, waarvan zes gekozen zullen worden op eene jaarlijksche publieke vergadering voor dat doel door den Magistraat van de Afdeeling opgeroepen.

Minstens veertien dagen kennis zal in de *Gouvernements Gazette* gegeven worden en eene kopie van zoodanige kennisgeving zal op het kennisgevings-bord van des Magistraat's Kantoor, en op andere publieke gebouwen aangeplakt worden, en zal ook aan de politie overhandigd worden, ter vertooning aan de boeren met hunne gewone patrouilles.

2. In geval meer dan zes nominaties ingezonden worden, zal de verkiezing van leden der Commissie per ballotage geschieden.

3. De Districts Veearts en de Vee Inspecteur van het District zullen *ex officio* leden van de Commissie zijn.

4. De Commissie zal haar eigen voorzitter aanstellen.

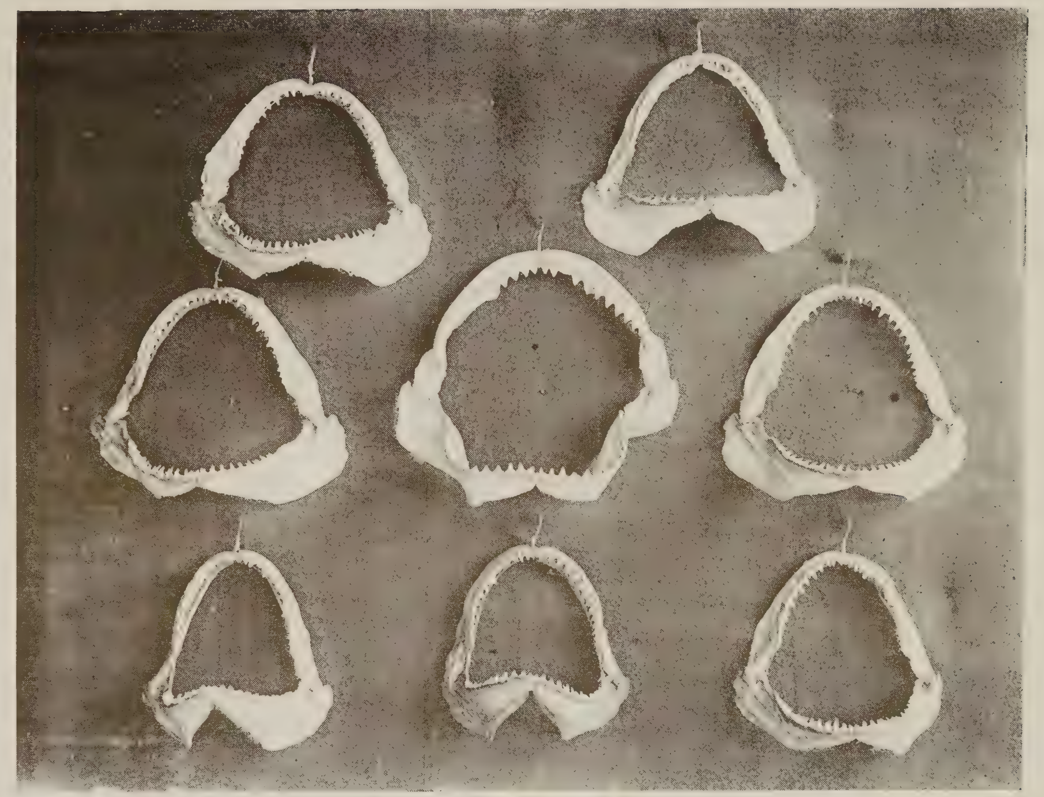
5. In geval van eenig verschil van meening onder de Commissieleden, zal de meerderheid beslissen.

6. Drie leden zullen een quorum uitmaken.

7. De plichten der Commissie zullen zijn: (*a*) In overweging te nemen en te besluiten over eenige applicatie, die haar onderworpen wordt door den Principalen Veearts om beesten binnen het District uit andere Districten te brengen; (*b*) om permitten uit te reiken als individueele leden der Commissie voor de beweging van beesten binnen hunne Districten alwaar zoodanige beweging veroorloofd wordt door den Minister van Landbouw; en (*c*) algemeen den Minister van Landbouw raad te geven en te assisteeren in alle zaken ontstaande uit de Akte.

8. De Commissie zal minstens eenmaal per maand bijeenkomen, maar de Voorzitter kan de leden der Commissie ten eenigen tijd bijeen roepen met het doel om te discusseeren eenige zaken of kwesties verbonden aan de Oost Kust Koorts die men wenscht voor het Gouvernement te brengen, en het Gouvernement kan ten eenigen tijd eene speciale vergadering, door middel van den Districts Veerats of Vee Inspecteur, oproepen voor dergelijke doeleinden.

9. Alle aanbevelingen of voorstellen van de Commisse zullen het Gouvernement door middel van den plaatselijken Veearts of Vee Inspecteur toegezonden worden.



A COLLECTION OF SHARKS JAWS.

Taken from sharks caught by Mr. J. J. Stephenson, of the Department of Agriculture.]

10. Het Gouvernement zal de macht hebben van de Commissies te verwijderen eenige leden die verzuimen drie aaneenvolgende vergaderingen der Commissie bij te wonen, of die strijdig handelen met de machten hen bij deze Regulaties verleend.

11. Leden der Commissie zullen niet gerechtigd zijn tot eenige bezoldiging van hunne diensten.

12. Eenige vacaturen ontstaande op zoodanige Commissie gedurende het jaar zullen door de overige Commissieleden opgevuld worden, onderworpen aan de goedkeuring van den Minister.

13. De Districts Veearts of Districts Vee Inspecteur zal notulen van alle verrichtingen der Commisse houden en bewaren, en alle zoodanige notulen zullen aan goedkeuring onderworpen worden op de vergadering eerstvolgend op die waarvan de notulen zijn. Zoodanige notulen zullen aangeteekend worden in een boek voor dat doel gehouden en zullen de namen van al de leden aanwezig op elke vergadering behelzen.

POLYEMBRYONY OF THE ORANGE.—In the second volume of *Agricultural News* (Barbados) it is explained that, in the orange, besides the embryo which proceeds normally from the fertilised egg-cell, other embryos arise from the tissues of the nucellus. It is assumed that the occasional polyembryony of the mango is also effected in this way. It is well known that one orange seed often produces several seedlings. A writer in a recent number of *Agricultural News* states that, on one occasion, he found no less than eight such seedlings. These were carefully separated and grown. If they, too, he remarks, had been left together, the strongest growing one would doubtless have stifled the others. It is probable, he continues, that only one of these embryos is the result of fertilization, and that the rest are developed asexually in the ovule. For, on hybridizing oranges, when the seedlings produced from one seed are separated and grown apart, it has been found that only one shows the effect of hybridization. Since the others are the result of asexual propagation, it is to be presumed that they might inherit all the qualities of their parent, just as if they had been propagated by budding. Hence it might be worth while, in growing good qualities of oranges from seed, to separate the seedlings from each seed and let each grow up. It seems not improbable that three-quarters or more of the orange trees so produced might be nearly exact replicas of their parents. If this is so, the fact that the orange has been grown from seed in the West Indies for some time without greater deterioration is partly accounted for. It would be of interest to know whether all of the two or more embyros which occasionally occur in the mango seed result from fertilization, or not.

Horsesickness.

By H. WATKINS-PITCHFORD, F.R.C.V.S., F.R.S.E.

THE following paper was recently read at the Natal meeting of the S.A Association for the Advancement of Science. Although in the form of a Presidential address to an audience interested particularly in science, it contains details of general interest, and makes an announcement towards its close which gives promise of attaining at last the long sought means which will produce with safety a mild and, it is hoped, protective form of the disease, both in the horse and the mule.

It was not without much diffidence that I decided to accept the invitation to fill the office of President of this Section. While some achieve greatness others have greatness thrust upon them; and in this latter category I feel my position at the present moment places me. Our Sections—literally from A to Z—including Agriculture, Bacteriology, Botany, Forestry, Physiology, and Zoology, comprise a field so broad and embrace such widely-sundered lines of scientific thought that it is obvious one individual, though he may have the hardihood to preside over such a Section, cannot pretend to more than a superficial knowledge of the majority of subjects included therein.

It occurs to me that the Schoolmaster of Goldsmith's "Deserted Village" would have made an excellent sectional President, for you will remember that amongst other scientific acquirements:

> " Lands he could measure, time and tides presage,
> And e'en the whisper ran that he could gauge ;"

while so renowned among his associates were the other attainments of this versatile individual that:

> " . , . . . Still the wonder grew
> How one small head could carry all he knew."

Since Goldsmith wrote his lovely poem, however, the Age of Specialism has overtaken us, and no man who endeavours to make a profound study of one branch of scientific thought can hope to make other than limited excursions into the fields of science outside his own immediate province.

The old classical prohibition *Ne sutor ultra crepidam* was never more applicable than in these later times of strenuous endeavours along specialised lines: and every "Cobbler" who sticks to his own particular "last" finds it provides him now-a-days with sufficient occupation of time and thought to fill a busy day. I shall not therefore attempt to comment or trespass upon other subjects of our Section (with which I can claim but a nodding acquaintance, so to speak), but shall confine my remarks to one small corner of my own special subject—Bacteriology —knowing that, even after so narrowing down my horizon, I shall frequently be confronted with the unexplored and unknown, and at best be able to throw but a feeble ray of light upon a subject in which all South Africans must be more or less interested.

The Horse—with his congener the Mule or Ass—has been bound up with the progress of man from remotest times, and, though he is perhaps less to us in these days of mechanical appliance than he was to our forefathers, a moment's reflection will suffice to show that he is still indispensable to us in our pursuance of the arts of Peace or the successful waging of War. The welfare of the horse—for it is with the horse that I would deal—and the suppression of a horse-disease which has almost extinguished the species in vast tracts of our Continent towards the Equator—a disease which year by year demands from the horse-owner a heavy toll—constitutes a question to which none of us can feel indifferent, involving as it does a problem nearly related to the prosperity, economical and social, of the land in which we live.

With the barren speculation as to when, or in what manner, this disease first gained a footing in our sub-Continent I do not wish to engage your attention, but we know from the records of the Cape Colony that this equine scourge troubled the very early settlers as much as it does the South Africa of 1907; and, were it not foreign and perhaps inappropriate to the present paper I think I might interest you for some time by laying before you the theories held in early times concerning the causation of the disease, theories which we, in the clearer light of progressive science, may be inclined—though not perhaps altogether reasonably—to deem fantastic and absurd. Cold, dew, miasma, cobweb, the precipitation of pathogenic spores from high altitudes, the gummy exudation from our indigenous thorn or mimosa trees, mists and winds from certain points of the compass, besides many other theories, have each in their turn been advanced to account for the incidence of horsesickness.

It is, of course, easy to argue from the cause to the effect when the former has been established, but it has always struck me as strange that amid so many theories and speculations the parallel of the Malarial disease of man had escaped application to horsesickness. Both are essentially paludal—that is marshy diseases—and the conditions favourable to the spread of the one must always have also been concerned in the manifestations of the other disease.

Shortly after coming to the country in 1896 I suggested, in some of my earlier observations, the parallel between malaria and horsesickness, and attempted to apply the comparison to the solution of the question of the cause or etiology of the latter disease. An irreconcilible difference, however, appeared to exist in the presence, microscopically, in one disease (malaria) of a large and well demonstrable organism, and in the other of an ultra-microscopic organism which rendered the parallel between the two diseases a difficult one to accept. The similarity in some points between horsesickness and the human disease yellow fever did not at the same time escape comparison, for while the paludal influence was existent in both diseases the ultra-microscopic cause was common to horsesickness and yellow fever, *i.e.*, the *materies morbi,* germ, causal factor, or whatever one elects to call it, was invisible to the most careful microscopic scrutiny in both yellow fever and horsesickness, and was capable of passing through the pores of a porcelain filter fine enough to arrest the passage of all known microbes. In view of certain parallels in the incidence and morbid anatomy of malaria and yellow fever of man, I hazarded the suggestion that the causal factor of horsesickness was a flying insect, probably a mosquito; and this opinion received strong support from the subsequent discovery that yellow fever also was due to the attack of a mosquito (*Stegomyia fasciata*). Thus horsesickness as an insect-borne disease with an ultra-microscopical organism found a further parallel in the yellow fever of man.

It was not, however, until 1901 that I was able to put this theory to the test, for the visitation of rinderpest and the late Boer war prevented the carrying out of any adequate line of experimental work. Field experiments, however, conducted in 1901 resulted in my being able to demonstrate the agency of a flying-insect in the production of the disease and to suggest a practical method of preventing the same by keeping stables, horse-lines, etc., and their immediate environs enveloped from sunset to sunrise in a haze of smoke generated by smouldering fires of damp hay, stable litter, etc. Where such measures have been adopted, the best results have been secured, but where the precaution has been undertaken in a half-hearted and perfunctory manner or where it has been necessary to use horses after sundown or even leave them standing still during sultry days in dangerous localities, the disease has manifested itself, though such animals may have been stabled at night in a smoky atmosphere.

The actual species of mosquito or blood-sucking fly concerned in the production of the disease is still a matter for future research, but the decision of this point cannot, I think, have any very great weight in regard to the question of the prevention of the disease, which is the all-important question from the point of view of the horse-owner as well as that of the practical investigator.

The problem of protection or the production of an immunity to this disease has exercised the minds of scientific workers in South Africa, particularly during the last decade. Efforts towards this end have even been made also by scientists in London, Paris, and elsewhere, but though such men as Koch, Bruce, Danyz and Bordet of the Pasteur Institute, Theiler of the Transvaal, and Edington of the Cape, have brought their experience to bear on the problem, no adequate means of immunising—and so preventing the horse contracting the disease—have been devised.

While each worker has added something to the sum of our knowledge, no one has been able to do for horsesickness what, for instance, Jenner did for small-pox or Pasteur for rabies. Edington of the Cape, who worked long and laboriously at the problem, was the first to show, in 1900, the possibility of producing by hyper-immunisation a serum which would to some extent arrest or modify the course of the disease. Professor Koch later, in 1904, followed on much the same lines, but did not materially advance our prospects of a practical method of inoculation. Dr. Theiler, however, of the Transvaal, pursuing the same system of serum-therapy, has been able at last to devise a method whereby the mule can be rendered practically immune to attacks of the disease, and to this worker, who has done so much for science in other branches of preventive medicine, we must accord the honour of first practically applying a system of prevention which—though still on approbation as regards the length of immunity conferred—bids fair to solve the difficulty of keeping the mule alive in districts where it previously ran much danger of succumbing to the disease. The system employed, as you are probably aware, is in brief and simple language somewhat as follows:—

A mule recovered from the disease is subjected to repeated and increasing injections of blood taken from other mules suffering from the disease. In time its blood becomes strongly antidotal, and when this blood—or the serum of the blood—is injected into healthy mules together with a small dose of virulent blood taken from a mule suffering from the disease, a mild form of the disease follows which protects against a natural and possibly fatal attack of the disease. The quantity of this antidotal serum necessary to immunise one animal is 300 c.c., which is equivalent to about a pint of the original blood of the immune mule, which mule would, upon this computation, furnish sufficient serum to immunise 8 to 10 other animals at one abstraction of blood.

The degree of susceptibility of the mule, however, to the disease is considerably less than that of the horse; and a system which can with safety be applied in the case of the mule, fails when the attempt is made to apply it in the case of the horse.

The marked susceptibility of the horse to the disease does not constitute so great a difficulty to the scientific worker, however, as the fact that the *degree* of susceptibility between *different* horses is extremely variable, so that preventive measures adjusted safely to one prove dangerous to others.

This is the main difficulty which has confronted successive investigators and checked the devising of a practical system of preventive inoculation. Where the subtle difference lies between mule and horse or horse and horse, we know no more than we know the reason why the sheep of Algeria defy a disease (anthrax) which is fatal to sheep in all other countries.

In following a case of infection by horsesickness in the horse, we find that, when a fatal issue is about to ensue, certain of the white cells of the circulating blood become greatly reduced in their numbers, and, conversely, when an animal has become infected and has successfully resisted the disease, these particular white cells—the polymorphoneuclear leucocytes—become largely increased in numbers. Successful resistence, therefore, to the disease-attack increases the number of these particular cells, and defeat and approaching death can be foretold by their diminution and disappearance.

Knowing the functions and behaviour of these cells in diseases other than horsesickness, we are justified from the above facts in attributing to the class of white cell an essential part in the defence of the system against horsesickness. The highly resistent or hyper-immune horse which can tolerate enormous doses of infectious blood does not, however, show any permanent increase in the number of these cells; and, further, the blood of such a horse could be abstracted and replaced by the blood of a nominal horse—all of these cells being thereby theoretically removed—and still the animal would retain its immunity or resistive power to the disease. The defensive mechanism, therefore, of the immune horse cannot be entirely with the white cells circulating in the blood.

Through the researches of Metchnikoff, however, we know of the existence of other cells—the so-called "fixed cells"—which, while immobile and attached to the various organs and tissues in which they are found, are nevertheless able to exert a defensive action similar to that of the free or wandering white cells. When once these cells, free and fixed, have become trained to take the offensive against the microbe of horsesickness—Metchnikoff speaks of the "education" of the cell—the animal successfully resists and so becomes immune. Thus immuned successive re-infection, either naturally or artifically, strengthens the defensive mechanism and increases the degree of immunity to such an extent that we are able, if we wish, to abstract the animal's blood and utilise this form of the defensive and prohibitive principle in the so-called "immune serum."

As far as we know there is only one way in which the horse can become actively immune, and that is by fighting and overcoming the microbe of the disease. Natural recoveries from horsesickness, however, are not at all so rare an occurrence as we have in the past supposed. When the disease has progressed as far as the stage of effusion into the lung and heart sacs, recovery is indeed a forlorn hope, but I am convinced that thousands of horses are annually infected with horsesickness and recover from the same without raising the suspicion in their owners' minds of the existence of the disease. In fact, the horse is quite able to "put up a fight," as the saying is, against the disease, and often to win the battle through the help of that best of physicians, viz., *medicatrix naturae;* but where the infected animal is handicapped by debility, bad management, hard work or excessive exercise, the disease becomes established in its familiar and recognised phases, and, when matters have gone thus far, vain is the help of man.

If natural attacks and recoveries are frequent, it would seem that no great difficulty should be met in securing recovery from experimental infections. Such, however, is not found to be the case in the horse with his very varying degrees of susceptibility; and hitherto the introduction of even minute doses of virus—if sufficient to evoke a reaction at all—have been attended by the gravest risk of the disease "getting out of hand," so to speak, and imperilling the animal's life, even where large quantities of immune serum are given in the hope of holding the infective process in check. With the mule, whose susceptibility is more nearly on one plane, there is much less tendency to this "getting out of hand"; and it is possible, as Theiler has shown, to pilot this animal safely through the infection by the use of immune serum in large doses injected together with the virus of the disease.

Where, then, is the best point for attack in this problem of the protection of the horse?

My own impression—formed from following closely the work of Edington and Koch, as well as from my own laboratory experiments—is, that serum-therapy (*i.e.* the use of hyper-immune serum as a controlling and resisting agent) will not assist us greatly. Serum is uncertain in its effect, often over-restraining by a passive immunity when we seek to produce a reaction, and as often failing to exert a sufficiently restraining influence, and permitting a dangerous reaction to ensue. We cannot standardize it and so adjust the exact doseage, because the virus of horsesickness differs greatly in its virulence and varies from one locality to another. If we attempt to mix the different strains of virus in the hope of securing a more uniform degree of infection, we are still confronted with the difficulty that the horse, which is practically the only animal suitable for the purpose of standardizing the virus upon, differs greatly in his degrees of susceptibility; so that a given dose of our uniform virus, which would produce in one case a mild attack, would cause death in another. This prevents our estimating or prearranging, except in the most general way, the restraining or protective influence of such serum in any given case of infection.

I dare not attempt to dogmatise or to put forward my views on this point as final, but I am not sanguine that the application of serum-therapy to the immunisation of horses against horsesickness will be attended with any very practical or satisfactory results.

The point of attack, therefore, has for some time past seemed to me to be rather in the direction of attempting the modification of the actual virus itself, and, by reducing it to its lowest degree of virulency without impairing its activity, to render it safe for the inoculation of even the most susceptible horse. As the susceptible horse will naturally be the first to fall a victim to the conditions of natural infection, I am sanguine that it will be proved that the establishment of an immunity sufficient to meet this degree of susceptibility will be sufficient to meet the practical needs of the question. In other words, if we can protect our most susceptible horses, the less susceptible can be left to look after themselves in normal seasons.

Such an attenuated virus would be a vaccine; and it is by the use of such a vaccine that I hope this very knotty problem in preventive medicine is going to be solved. The Scientist can accept nothing which has not stood the test of time and the proof of varied application, but I feel sanguine that such a vaccine is within our grasp.

Printed on the screen you will see a number of recent charts both of horses and mules; and if you are familiar with the reading of a temperature chart, you will see the pronounced reactions which most of these animals have gone through, reactions produced by different strains of horsesickness virus, which has been attenuated so as to produce a definite though controllable, form of horsesickness. These reactions on this side have been produced with the most virulent strain of virus I could procure, while those are from virus taken from other sources. A small percentage of the horses inoculated in this manner have proved refractory, but I am hopeful that, if a horse fails to react to large doses of this vaccine, he will prove refractory to the conditions of natural infection. The reaction, as you see from the charts before you, is a well marked one; and if modified attacks of horsesickness confer any substantial degree of immunity (a point on which all workers with the disease seem agreed), I am satisfied the main difficulty of producing with safety a modified attack of horsesickness has been overcome.

Whether the horse can be safely passed through this modified phase of the disease in the warm weather, whether a further inoculation of a stronger or less attenuated virus will be necessary to ensure complete resistance, how long the immunity acquired from the mild attack will last, and whether it will be necessary to adjust the vaccine to differing localities, are all questions, besides many others, which future observation must decide.

My resources in time, help, and material have in the past been straitened, and I have envied (I hope in no unscientific spirit) the ample resources of other workers in the same field. More adequate facilities are now at command, and I hope future progress will be commensurate with broadening opportunities.

I have intentionally refrained from referring to details of technique, and with my reasons for reticence in this respect I believe you will not be found to disagree. Much more extended observation is necessary to show the limitations of the method, to prove its practical usefulness and to bring to light and correct its drawbacks, and for the satisfactory arrangement of these points time and increased facility are essential. I have, therefore, thought it better to bring the foregoing subject to your notice as an Interim Communication (a Progress rather than a Final report) and wait a future opportunity of making a final communication based upon the results of extended observations under practical rather than laboratory conditions.

Our monetary loss in Natal during the past season has been at least £12,000, and £50,000 is a small estimate of the loss to South Africa; but, apart from economic considerations, the mass of animal suffering reflected in such figures is sufficient to render the hope of its alleviation a fortunate ambition for all workers at this disease who, though perhaps not successful in solving the main problem of entire prevention, at least enjoy the privilege of helping in some measure to advance the quest to a final and successful issue. We can safely say the successful man will owe as much to the efforts of others as to his own endeavours, for investigations of this sort are progressive and one worker builds on the foundation of his predecessor.

If a poor farm is taken in hand by an energetic man who is up-to-date in his knowledge and practice, it can generally be transferred in a few years into a satisfactory property (says the *Queensland Agricultural Journal*). The growth of a good green crop by the help of liberal dressings of phosphatic fertilisers is the first step, and afterwards the ploughing under of the green stuff. When the soil is provided with the humus and nitrogen of green crops, it will begin to improve and soon pass from the condition of an invalid into a farm of robust condition.

"Georgicus," writing in his monthly notes on Coast Agriculture to the *Mosquito*, reproduces the letter by Mr. F. W. R. Panzera that appeared in last month's *Journal* on Burlington Hybrid mealies, and adds the following note:—"I know this mealie well, and have always grown some for table use. It is infinitely superior for this purpose to the ordinary mealie, and I have never been successful with the regular American sweet corn. This mealie is a hybrid between the sweet corn and the ordinary mealie, and evidently is most prolific. I would recommend Coast agriculturists to apply to Messrs. Kirchhoff or Mr. Panzera for seed. Near Durban a good many acres might be profitably planted in succession, for sale as green mealies."

South African Products Exhibition, London, February, 1907.

NATAL SECTION.

LIST OF AWARDS MADE BY THE EXECUTIVE COMMITTEE.

THE following is a list of the awards made by the Executive Committee of the South African Products Exhibition to exhibitors in the Natal Section. In no case were awards made for any of the Government exhibits or for minerals:—

	Silver Medals	Bronze Medals	Diplomas.
Wool, Merino—			
James Morton, Tweedie Hall	1	..	..
H. Walker, M.L.A., Highflats	..	1	..
Wool, Shropshire—			
G. Richards, Mooi River	..	..	1
Tobacco and Cigars—			
Natal Tobacco Plantations, Ltd.	1	..	..
W. Starr, Verulam	..	1	..
W. Bunge, Murchison	..	..	1
J. A. Freerks & Co., Durban	..	..	1
Chetty & Co., Durban	..	..	1
Butter—			
Natal Creamery, Ltd., Mooi River	1	..	..
Nel's Rust Dairy Co.	..	1	..
W. Moller, Marden Ash, Normandien	..	..	1
Cheese—			
Norrish & Co., Maritzburg	1	..	..
Oat Forage—			
T. Braithwaite, Seven Oaks	..	1	..
Lucerne Hay—			
D. C. Slatter, Weenen	1	..	..
Grass Hay—			
John Moon, Manderston	..	1	..
Mealies—			
John Moon, Manderston	1	..	..
W. B. Bosse, Rosebank	..	1	..
Archibald & Co., Durban	..	..	1
Kafir Corn—			
R. Mason & Son, Maritzburg	1	..	..

	Silver Medals.	Bronze Medals.	Diplomas.
G. Carter & Co., Maritzburg	..	1	..
G. Ross, Riversdale	..	..	1
J. A. Peters, Maritzburg	..	..	1
Millets—			
G. Carter & Co., Maritzburg	..	..	1
R. Mason & Son, Maritzburg	..	..	1
Beans—			
W. B. Bosse, Rosebank	..	..	1
R. Mason & Son	..	1	..
Peas—			
G. Carter & Co., Maritzburg	..	1	..
J. A. Peters, Maritzburg	..	..	1
Rubber—			
Messrs. Lepper & Pennington, Maritzburg	1	..	..
Mealie Meal—			
R. Mason & Co., Maritzburg	1	..	..
Pineapples—			
Natal Government, Winkel Spruit	..	..	..
Natal Fruit Export Co., Durban	1	..	..
W. Thompson, Umkomaas	..	1	..
Plums—			
Mrs. E. T. Mullens, Maritzburg	..	1	..
Jellies and Marmalade—			
Mrs. P. H. Campbell, Chase Valley	1	..	..
Mrs. Turner, Maritzburg	..	..	1
Mrs. Stayner, Cedara	..	..	1
Canned or Bottled Fruit (Trade)—			
Messrs. Trotter & Co., Pinetown	1	..	..
Condiments—			
Mrs. Vincent Seymour, Malvern (Chutney)	1	..	..
Messrs Trotter & Co. (Chutney and Curry Powder)	..	..	1
Messrs. Bazley Bros., Barnesdale (Cayenne Pepper and Chillies)	..	1	..
Sugar—			
Natal Estates, Ltd., Durban (*awarded Silver Gilt Medal*)			
J. L. Hulett & Sons, Durban	..	..	1
E. W. Hawkesworth, Equeefa	..	..	1
Tea—			
Bazley Bros., Barnesdale	1	..	..

	Silver Medals.	Bronze Medals.	Diplomas.
Aroma Tea Estate	..	1	..
J. L. Hulett & Sons, Kearsney	..	..	1
W. R. Hindson & Co., Clifton Tea Estate	..	..	1
Coffee—			
Bazley Bros., Barnesdale Estate	..	..	1
Arrowroot—			
Archibald & Co., Umzinto	..	1	..
Cotton—			
W. Cato, Hillarys	1	..	..
D. C. Slatter, Weenen	..	1	..
J. Kirkman, M.L.A., Esperanza	..	..	1
D. E. Mitchell, Imbezana	..	..	1
Wattle Bark—			
Estate H. von Bulow, Dalton	1	..	..
Holley Bros., Broadmoor	..	1	..
Harden Heights Wattle Co., Ltd.	..	..	1
Town Hill Wattle Co., Hilton Road	..	..	1
Mooi River Wattle Co.	..	..	1
Ostrich Feathers—			
G. S. Keel, Impanza	..	..	1
Samp—			
T. Lawes, Maritzburg	..	..	1
Manufactured Timber Goods—			
Merryweather & Co., Maritzburg	1	..	..
Manufactured Leather Goods—			
Lyle Bros., Maritzburg	1	..	..
Manufactured Leather Goods and Basket Ware—			
Trappists, Marianhill	..	1	..
Aloe Fibre—			
South African Industrials, Ltd., Port Shepstone	1	..	..
Mr. Plows, Port Shepstone	..	1	..
Ramie Fibre—			
J Eglington, Maritzburg	..	1	..
D. C. Slatter, Weenen	..	..	1
Silk—			
G. I. W. Sim, Maritzburg	..	1	..
Publications—			
P. Davis & Sons, Maritzburg	..	1	..
Scientific Books on South African Subjects—			
T. R. Sim, Maritzburg	..	..	1

	Silver Medals.	Bronze Medals.	Diplomas.
Builders' Materials—			
A. Oliff, M.L.A., Maritzburg (Bricks)	..	..	1
D. C. Aiken, Port Shepstone (Marble)	..	1	..
Angora Skins—			
G. Melville, Maritzburg	..	1	..
Spirits—			
A. Wilkinson, Ottawa Estate	..	1	..
Wines—			
A. Dryden, Pinetown Bridge	..	..	1
Sweet Potatoes—			
W. H. Goble, Clairmont	..	..	1
Monkey Nuts—			
Archibald & Co., Umzinto	..	..	1
Collection of Kinds of Mealies, Sorghums, Beans, etc.—			
Director Experimental Stations, Cedara	..	..	..
Collection of Seeds—			
R. Mason & Son, Maritzburg	..	1	..
G. Carter & Co., Maritzburg	..	..	1
Collection of Native Manufactures, Curios, Horns, etc.—			
A. Hughes, Maritzburg	..	1	..
Leopard's Skin—			
F. W. Shaw, New Hanover	..	..	1
Bucks' Skins—			
Hon. W. Deane, Sevenoaks	..	..	1
Photographs and Lantern Slides—			
W Allerston, Maritzburg	1	..	..
J. Watkinson, Railway Photographer, Maritzburg	..	1	..
Castor-Oil Beans—			
W. Cato, Hillarys	..	..	1
Lycopodium Plants—			
Botanic Gardens, Maritzburg	..	..	1
Fish Scale Work—			
Miss G. C. Anderson, Durban	..	1	..
Medicinal Products—			
H. Illing, Ladysmith	..	..	1
	20	28	39

Experiment Farms.

CEDARA.

To Director Experiment Stations.—

The weather during July has been very cold and wintry throughout, but quite seasonable and much in keeping with that of the previous month. On 26 days frost was registered on the vlei, the mean minimum being 27 degs. Fahr. The lowest reading was 19 degs., and the mean maximum recorded was 68·74 degs. Frost was experienced on four days only on the hill: the mean maximum and minimum readings there were 71·41 degs. and 35·5 degs. respectively. The hill site for the thermometer is practically at the College, and the vlei one adjoins the spruit in close proximity to the main entrance of the Farm. The distance is well within a mile, but the variance of temperature from the high and low ground is very marked.

The work in general has been rather disjointed during the month owing to the students having each a fortnight's holiday. Arrangements were made that they should take it in turn so that as little interference to the work as possible might be caused. At the end of the month all had returned, and I am pleased to say with an additional eight students. Three were transferred to the Coast Farm at Winkel Spruit for a course there in tropical agriculture, while one is still at the Weenen Station.

On field work, ploughing has been carried on chiefly on the vlei so that the stiff soil may be rendered mellow and in good tilth for spring crops. Drainage has been occupying attention also. Drain pipes for the lateral drains have arrived, and it is hoped that a good many will be laid during the current month. There is no doubt whatever that the work entailed in reclaiming the vlei soil is fully warranted as it is undoubtedly the best soil on the Farm; and I should be very glad if it could be found convenient to allocate a good portion of it for the growing of lucerne to be available for the feeding of all stock.

The temperature returns, as will be seen, are exceptionally low this season; and I have no doubt it will be of interest to report on the condition of certain grasses grown on the vlei:—Tall Oat Grass (*Avena elatior*), Cocksfoot (*Dactylis glomerata*), Canada Blue Grass (*Poa compressa*), and Kentucky Blue Grass (*Poa pratensis*) have stood the frost well and are quite green, particularly the Tall Oat Grass, which has proved all along to be a good frost resister. *Paspalum dilatatum*, about which numerous enquiries are made, has not resisted the frost very well, but, of course, will make a very rapid start in spring.

The working stock are healthy. The heavy draught horses have had rather an easy month, and are in very good condition. Six mules have been transferred from the Transport Department to be available in carting from the station the offal from the Government Abattoir. The poultry are doing well and now laying. The College has been supplied with a quantity of eggs and the incubators filled. We have now pens of Buff and Black Orpingtons, Silver Wyandottes, White Leghorns, Plymouth Rocks, White Minorcas and Indian Game, from which egg-laying records are being secured by means of trap-nests. The Persian sheep are doing very well, and are due to commence lambing about the end of the month. One Persian ram was sold at the Durban Show.

The Blacksmith, Carpenter, and Storeman are being fully occupied in their respective branches of work. The Carpenter had his annual leave in the early part of the month.

In order that the students may have tuition in bricklaying, a bricklayer attends and gives practical instruction 2 days a week.

An exhibit of winter foods, etc., and four Persian sheep were put on the Durban Show.

ALEXANDER REID,
Farm Manager.

WEENEN.

To Director Experiment Stations.—

The weather for the month under review has been dry but warmer than the previous month, the effect of the change being very apparent on the various crops, which have made good growth; the earlier varieties of cereals are now beginning to pipe and look very promising.

The continuous work of irrigating one or other of the various crops has been attended to with little inconvenience, a good supply of water being always obtainable.

Nine varieties of tobacco seed have been received from the Central Farm, Cedara; and the first sowing of all varieties has been made in nursery beds. These are protected from the frost at night and sun in the daytime by scrim covered frames (size 3 feet 4 inches by 2 feet 4 inches), obtained from Messrs. Roff & Co., of Durban, for the modest sum of 4s. per dozen on rail. These are very convenient for any nursery work. Up to the present, nine applications for tobacco seed have been made by settlers, and these I have supplied with sufficient seed of one variety for a first sowing, and other parcels will be issued as occasion requires. One or two settlers have signified their intention of planting from five to ten acres with tobacco, so it would appear they do not intend allowing the grass to grow under their feet during the coming season.

The work of excavating the main drain across the lower end of the block is practically finished, and I shall furnish you with the measurements so that the pipes may be obtained in order to allow me to finish this work at an early date, as the fast approaching summer will necessitate my putting the labour on to other work. Approximately 200 yards of drain have been excavated along and close to the eastern boundary fence, averaging 3 feet deep.

The farm buildings have been repaired where necessary, and all outside woodwork painted, the wall receiving a coat of limewash inside and out.

All live stock are healthy.

W. HOSKING,
Curator.

WINKEL SPRUIT.

To Director Experiment Stations.—

The month of July has passed, leaving behind it a record number of signatures in the visitors' book since the inception of this Farm.

All hands have been extremely busy clearing land for orchard, erecting sheep and pig proof fences, trashing cane in readiness for cutting (which we hope to start about the 12th of August), transplanting of onions and rhubarb, and cutting and crushing cane for the Analyst (Mr. Pardy), who has been here for a week taking the polariscope reading of the juice from the different manured and unmanured plots. These polariscope readings should prove very valuable to cane growers taken in conjunction with the results to be tabulated when the cane is cut, and should effectively determine the best and cheapest fertiliser to use for heaviest crops and best sugar contents.

Two students arrived from Cedara during the month and are taking a great interest in their work, giving entire satisfaction.

The correspondence in connection with the different crops grown on this farm is increasing rapidly, no less than 32 letters being received wanting fullest information *re* the growing of cane, maize, beans, arrowroot, peanuts, chicory and fibre. Great interest appears to be taken in the results of our distance of planting maize and detasseling of alternative rows. A great number of my correspondents are young farmers making a start in Zululand and on the North and South Coasts.

On the 30th of the month we had a splendid rain, 1·52 inches being recorded. This is the best rainfall for the past three years for July, and has helped us considerably with the turning over of new land for orchard, which is being pushed on with as fast as possible. The rain has also greatly assisted the young onions, over 7,000 of which were transplanted a few days beforehand.

There is an abundance of work for more than double the number of labourers now employed if we wish to have everything in readiness for the coming planting season. Several hundred yards of drainage are one of the most important items.

Several varieties of garden peas were planted in the last week of June and are making good growth.

Mostly all the beans are ready for picking and will be harvested early in August.

The pigs which were used for feeding experiments in open paddocks are now styed, and will finish off the experiments there on set rations, when they will be well fit for market.

W. JOHANSEN,
Manager.

CHICKEN POX.—One of the most common poultry ailments in Jamaica is what is known locally as "yaws"—called elsewhere chicken pox. A writer in the *Journal* of the Jamaica Agricultural Society gives some interesting notes on the disease. He points out that the chickens are allowed to sleep under the old hen, often in the old nest where they were hatched, or at any rate in the same spot, box or barrel every night without thought of cleaning that place. Thus they sit among their own droppings, often with the smell of foul droppings round them: sometimes they are closely shut up in a box or barrel to keep them from rats. The foul air poisons their blood and Nature attempts to throw off that poison through the eruptions characteristic of the disease. If the chickens were at once put under sanitary conditions these eruptions would soon break by the scratching of the chicken, and dry up without bleeding or eating into the flesh. But as the last thing that is thought of is at the root of the trouble and the poor chickens are looked upon as being very aggravating and inconsiderate to get sick, the eruptions spread and soon kill the little things miserably. It is suggested that the first thing to do is to provide a clean place for the chickens to sleep, and a little Jeyes' and water is also usually sprinkled under the hen's wings as her feathers are often saturated with the foul odour of excretions. Then dissolve two teaspoonfuls of Epsom salts in a pint of water and place this in a pan where the chickens must drink it—that is, let them have no other water. Do this three mornings in succession. Feed—rice, duck ants and worms instead of corn. Get 3d. worth of tincture of iodine and a camel hair brush—or, a feather will do: catch the chickens in the evening when they return one by one and touch the eruptions with the tincture. Do this three days also, and in that time the chickens should be better. The scales will drop off or can be rubbed off, leaving the flesh below clean. Tincture of iodine is said to be at once a safe, clean and effective application.

Gardening Notes for September.

By W. J. Bell, Nurseryman, Florist and Seedsman, Maritzburg.

KITCHEN GARDEN.

Main crops should now be sown for the following vegetables :—Dwarf Beans, Beet, Carrot, Cabbage, Cucumber, Egg plant, Leek, Lettuce, Mustard and Cress, Melon, Radish, Tomato, Vegetable Marrow, Squash, Capsicum and Chili. If required, this is also the best time to sow Asparagus, Globe Artichoke, Okra, Sweet Corn and Pop Corn. Jerusalem Artichokes should also be put in if not already planted.

The best varieties of Dwarf Beans for sowing now are Canadian Wonder, Golden Butter, Rustless Wax, and Henderson's Bush Lima. Plant about two inches deep in drills from 18 inches to 2 feet apart.

The Climbing or Pole Beans should now be sown. Three good varieties are the well-known Scarlet Runner, Mont d'or Wax podded, and Henderson's early Leviathan Lima.

Cucumbers, Marrows, Melons, and Squashes should be planted on small mounds about 4 feet apart each way.

Remove a few spadesful of soil and fill in with a mixture of good and rotten dung, forming little hillocks above the surrounding level. On these plants two or three seeds or young plants. Allow several plants to grow on each hill till strong enough to resist attacks of grubs. then thin out to one plant, leaving the strongest. If the grub is troublesome dust the surface round each plant with lime.

All the varieties of Squash may be sown now. Two of the best are Heart o' Gold and Delicata. Heart o' Gold yields large orange red fruits averaging 25 to 30 lbs. each, fine grained, golden red flesh, dry and sweet. The Delicata is small but exceedingly prolific, dry and sweet, and surpassingly rich in flavour.

Sow Sweet Corn and Pop Corn in rows three or four feet apart and one foot in the rows. The plants should be hoed when about a foot high. The Pop Corn is a favourite sweet in America. Allow the cobs to ripen thoroughly and then roast the grain in a closed iron vessel until they "pop," shaking the vessel meantime. This is produced by the explosion of the gas in the grain expanded by the heat. The "Pop Corn" is then taken out and slightly dusted with flour sugar, when they form a delicious sweet. Sow round Spinach for summer use; also the Spinach Beet. With this variety a constant supply is kept up throughout the summer.

Onions may be planted out now from the autumn-sown beds into a deep, rich soil, with the addition of a little lime or a good dressing of wood ashes.

Asparagus beds may be made this month, and seed should be sown now for planting out next spring. Sow in drills a foot apart, keep carefully hoed and free from weeds. The soil for the permanent beds should be heavily manured and trenched to the depth of a foot. Plant in rows three feet apart and one foot between the plants in the rows, spread the roots well out, and let the crown of the plant be set deep enough so that it will be covered from four to six inches. Give old beds a top dressing with salt or Nitrate of Soda.

FLOWER GARDEN.

In the midland districts all varieties of Tender and Half-hardy flower seeds may now be sown, such as Aster, Amaranthus, Acroclinium, Balsam, Calandrinia, *Celosia plumosa*, *Celosia cristata* or Cockscomb, Chrysanthemum tricolor, Cosmos, Dahlia, Ornamental Gourds, Helichrysum, Heliopsis, African and French Marigold, Nasturtium, Portulaca, Sensitive plants, Sunflower, Zinnia, etc.

Climbers.—The following climbers may easily be grown from seed sown this month:—Aristolochia, Clitoria, Coboea Scandens, Convolvulus, Eccremocarpus, Luffa or Sponge Gourd, Ipomeas of various kinds, Losphospermum, Mandevillea, Maurandya, *Mina lobata*, and Physianthus.

Sow in boxes or pots under glass Coleus, Gesneria, Gloxinia, Heliotrope, Impatiens or Zanzibar Balsams, Musk, and double Petunia.

In the up-country districts hardy flower seeds may now be sown, such as Candytuft, Antirrhinum, Calendula, Coreopsis, Cornflower, Dianthus, Gaillardia, Larkspur, Petunia, Phlox; also Poppy, including the Giant Oriental and Shirley.

Plant out Bulbs of the various kinds of Lily, including *Lilium lancifolium Album* (white), *roseum* (pink), and *rubrum* (red), *Lilium tigrinum* (double and single), *Lilium umbellatum*, and *Lilium Wallacei*; also the beautiful *Trigidia pavonia*, the Belladonna Lily, Maltese Lily, Scarboro' Lily, Day Lily (Hemerocallis), and Gladiolus. The Gladiolus will thrive in any good garden soil, but the bulbs must be planted not less than five inches deep in light soils and about four inches deep in heavy soils. They are very effective when planted in clumps of five or six in a clump.

Plant out Cannas, Dahlias, Perennial Phlox, Pentstemons, Abutilons, Camellias, Magnolias, Gardenias, *Hibiscus sinensis*, Oleanders and other evergreen flowering shrubs, also evergreen Creepers.

From 3,000,000 to 5,000,000 gallons of oil are annually made in the United States from mealies. The oil is used to some extent for culinary purposes, and also for lubrication and in the mixing of paint.

Correspondence.

CITRUS FRUIT CULTURE.

To the Editor of the "Agricultural Journal."

Dear Sir,—In your June number a letter appeared above the signature of Mr. G. C. Williams, appreciative of the value of Masters' system of Citrus culture. As an old and intimate friend of Mr. Masters, the following particulars will, I trust, prove interesting to your many readers.

The system he has developed is the result of many years of careful study and exhaustive experiment at considerable cost; and, being a former resident in the Cape Colony, he naturally offered his system and services to that Government—the system to be used as a secret method—but the offer was declined. He was then informed that if he took it to America he could get anything he wanted for it, either in cash to purchase it outright, or money and scope to work it, with participation in the results. His reply to this was that he had been resident in South Africa for 26 years; if his country could not afford to compensate him for his experimental losses or provide him with an opportunity of benefitting it by his knowledge, he would give it them as a present to induce belief.

Simultaneously he pointed out that, if South Africa refused to credit his knowledge and South America or men of intellect and capital in other parts of the world did appraise it at its true value, then his objective in publishing it—which was to benefit South Africa—would be lost, once again fulfilling the old adage that it is seldom a prophet is recognised in his own country. Even now I understand that a few of his points have been ascertained and are being secretly tested in other parts of the world, possibly for commercial advantage and to gain notoriety.

The system is not one for any one South Africa Colony to monopolise on its own behalf to the exclusion of the others, but should be carried out for the benefit of the whole of South Africa in its widest commercial sense. It will work in with agricultural co-operation and fruit exportation, the two matters our present Minister of Agriculture takes such an interest in, but, as Mr. Masters points out in his treatise, a matter that is left for everyone to do generally remains undone.

I think with Mr. Williams that Natal should take the initiative, for when Mr. Masters was round in Natal he thought very highly of its possibilities for the exportation of fruit, but saw that this enterprise lacked organisation and needed direction. I also saw his summary of Natal's possibilities as compared with the Grahamstown portion of the

Cape Colony, which was taken over by the Natal papers at the time. One thing I am certain of is that, if the South African Governments do not try to secure Mr. Masters' services, other countries will. His book is as yet unknown, seeing the last instalment was only published in the *Cape Agricultural Journal* in June last.—Yours, etc.,

A. A. OSBORN.

The Mount, Newcastle,
14th August, 1907.

PRESIDENT SLACHTER STRAWBERRIES.

To the Editor of the "Agricultural Journal."

Sir,—Having read the Orchardist's report on Strawberry culture at Cedara, in which he states he has not had a single favourable report from anyone supplied with plants of the variety "President Slachter," we feel it our duty to that Department to make known our experience.

We received some plants of this variety from Cedara in 1905, which we have established in these gardens; and although we have no data as to weight, quantity, etc., I have no hesitation in saying that "President Slachter" is far and away the best strawberry we have grown here yet. The plant is vigorous, a good cropper, fruit large, and of good form, and, what we consider of first importance, is firm and a fine colour.

I may say that we grow strawberries under difficulty, inasmuch as we have to protect the plants from white ants, but we have overcome this difficulty by constructing raised beds. We are looking forward to much better results than we have had yet; and we feel indebted to the Cedara Experiment Farm for the possession of a very useful strawberry.

Trusting you will find space in your *Journal* for this letter.—I am, etc.,

E. PATTEN,
Gardener to Sir B. W. Greenacre.

Musgrave Road, Durban.

MEALIE GRUB.

To the Editor of the "Agricultural Journal."

Sir,—I should like to know the best means of eradicating the common grub that attacks the mealie crop in its various stages.

The grub I refer to, is, when full grown, about 1 or 1¼ inches long, of a brownish blue or slate colour, and is very destructive to the young plant, simply cutting it off at the surface of the ground.

This grub (if the same) again appears in the top pith of the mealie stalk when the stalk is from 3 to 5 inches high, apparently having hatched in the soil and again settled near the top of the mealie stalk, where it developes, as it works its way down the centre of the stalk, again entering the ground, I presume. It is also found in the mealie cob, where it bores along, causing great destruction to the grain. Thanking you in anticipation.—I am, etc.,

JOHN HARPER.

Highflats, Ixopo.

[Our correspondent is confusing two distinct insects. The first one he refers to is what is known as the "cutworm;" the second is the "topworm." Full information regarding the various grubs or moth caterpillars which attack mealies in Natal was published in the February, 1904, issue of the *Journal*, in Mr. Fuller's series of "Letter Book Pages."]

A method of saving tobacco seed by means of "night-caps" is gaining headway in New England, Florida, and is being adopted in parts of Pennsylvania, New York, and Ohio, U.S.A. Just before blossoming a paper bag is placed over the buds, thus preventing cross-pollenisation. After the seed pods have matured the bags may be removed.

In 1906 India produced 240,849,894 lbs. of tea, of which 438,628 lbs. were grown in Burma, 162,468,034 lbs. in Assam, 60,134,577 lbs. in Bengal, and the remainder in other parts of India. In 1905 the total production was 221,488,139 lbs. In 1906 there were 529,995 acres under cultivation, as compared with 527,290 acres in the previous year. The total export of Indian tea during the year ended 31st March, 1907, by sea (including coastwise trade), was 234,431,815 lbs.; and by land, 2,299,808 lbs.; making a grand total of 236,731,623 lbs. The grand total for the year ended 31st March, 1906, was 217,297,452 lbs.

In an article appearing in the *Board of Trade Journal* on the foreign trade and shipping of China in 1906, based on the "Abstract of Statistics and Report on the Foreign Trade of China" for 1906, recently published by order of the Inspector-General of the Chinese Imperial Customs, it is stated that the exports of fibres show in general a steady increase, although the export from a country like China is "absurdly small." Hemp, jute, and ramie all increased in quantity, the export of jute being more than doubled. It is probable, it is stated, that much which, for taxing purposes, has been classified as hemp, is actually ramie.

Animal Diseases in July.

THE POSITION OF EAST COAST FEVER.

Reporting to the Minister of Agriculture on the position of East Coast Fever during the month of July, Mr. Woollatt, Principal Veterinary Surgeon, states that 15 outbreaks of the disease occurred during the month as follows:—Vryheid and Ngotshe, 8; Paulpietersburg, 4; Durban County, 2; and Utrecht, 1. The following deaths were reported:—Vryheid and Ngotshe, 600; Paulpietersburg, 44; Dundee and Umsinga, 205; Durban County, 66; Klip River, 26; Muden, 13; Umvoti County, 9; Lower Tugela and Mapumulo, 652; Zululand, unknown—making a total, exclusive of Zululand (for which no record is kept), of 1,615 deaths.

With regard to the outbreak of East Coast Fever in the Utrecht district, which occurred at the end of the month, Mr. Woollatt says that his Department has, so far, been unable to satisfactorily determine the source of infection. The farm "Langerswacht," on which the outbreak appears to have first made itself apparent, is really in the Magisterial division of Vryheid, but for quarantine purposes it was included in the Utrecht district about July of last year. Regarding the movement of cattle to this locality, the only information Mr. Woollatt has been able to obtain so far, is that, about the 10th of May, 1906, some cattle were taken on to the farm "Langerswacht" (then in the Vryheid division), which had come from the vicinity of the Ngotshe border, but which had been running on Lancaster Hill, near Vryheid, some time previous to going on to "Langerswacht." Three are said to have died on the latter farm within a month after their arrival there. The next death, as far as can be ascertained, occurred in August. In February two more head died in this locality, another in March, another in April, and a further one in June, and then three died in August, which are known to be from East Coast Fever. No information is forthcoming as to the actual cause of death amongst the isolated cases which died prior to August. These deaths were not reported.

In September or October a span of oxen was brought on to the farm, which had been working in the Mapumulo district; but these oxen were quarantined prior to being allowed to return, and the owner of the farm is positive that no deaths occurred amongst them after their return. The oxen did not belong to him.

Mr. Woollatt draws attention to the fact that the cattle brought there from the Vryheid district came some 18 months before East Coast Fever was known to exist there; and, although there is a certain amount of evidence pointing to these animals being the possible source of infection, Mr. Woollatt thinks, nevertheless, that it must be assumed that, had East

Coast Fever been introduced into this locality in May, 1906, the disease would have made itself much more evident during the past summer; and he is strongly of opinion, from the knowledge we have of the disease, and the life history of the ticks which are responsible for its dissemination, that, if the truth of the matter could be got at, it would be found that the infection was brought there probably about the month of March, April or May. There is no case on record (so far as Natal is concerned) where infection has been introduced during the winter, and has lain dormant, so to speak, during the whole of the summer months, for even if it be admitted that the three head of cattle which died prior to June, 1906, died of East Coast Fever, yet such a small mortality almost warrants the assumption that the disease was dormant if it existed then.

In connection with this outbreak, we are fortunate, Mr. Woollatt remarks, in having, on the Utrecht side, a farm fenced on each side, with no cattle on it, and there is, therefore, a zone already established, free of cattle, doubly fenced. It is also fortunate the outbreak made itself evident before the fence which is being erected between the Utrecht and Vryheid districts, was completed in this locality. The fence has, in consequence, been diverted to include the infected farms; and it is also possible to make use of the existing fences already referred to, some twenty miles of fencing being thereby saved.

The boundary of cattle on the infected and in-contact farms has been completed. There are some 480 head of cattle on the infected farms.

In the Vryheid district the branding of cattle is being proceeded with, also in the Ladysmith district on the east side of the main line of railway.

During the month the cattle on the actually infected area on the Weenen side of the Mooi River at Muden, were purchased by the Government and slaughtered, the owners voluntarily selling their cattle. This is also being carried out on a limited scale on the Umvoti side of the same area, the cattle being slaughtered within the quarantined area, and the meat conveyed by mule-wagon to the railway. A considerable number of cattle have yet, of course, Mr. Woollatt remarks, to be taken over before it can be said that this area has been dealt with by the stamping-out process in a satisfactory manner.

The purchase of cattle in the several infected areas for slaughter purposes was continued during the month on the same scale as before, which necessitates a considerable amount of work on the part of the Veterinary Department in seeing that these cattle are properly conducted to the railway, etc. Consistent, with safety, this buying of cattle should be facilitated as much as practicable, as it enables the owner to realise on his stock, and reduces the number of cattle in the districts, which will make it easier for the Department to deal with them when the stamping-out policy is resorted to.

"The Committees appointed in the several districts in connection with East Coast Fever have rendered valuable assistance and help to the Department," Mr. Woollatt says, "particularly in those districts where the disease is prevalent."

OTHER DISEASES.

Lungsickness.—No fresh outbreaks occurred during the month.

Sheep Scab.—During the month, Mr. Woollatt reports, there were 33 fresh outbreaks, and 18 licenses were raised.

Quarter-evil.—D.V.S. Verney (Mooi River) states, in his report to the P.V. Surgeon, that this disease has been exceedingly prevalent during this winter, especially in the Thorn veld. During the month 70 deaths took place in the Weenen Division, chiefly amongst Natives' cattle. Several deaths also occurred in the Ingogo district. The farmers in whose herds the deaths occurred have all inoculated their cattle, and there have been no further deaths since the middle of July.

Crop Reports for July.

Every effort is being made to increase the Department's circle of honorary crop correspondents; and, although the number of reports which have been received during the month is only a quarter of that which it is hoped will be forthcoming a month or two hence, it is nevertheless sufficiently large to enable readers of the *Journal* to be presented with some idea of the general crop and other conditions prevailing in certain parts of the country during the month of July.

So far as our reports go, the rainfall has been, speaking generally, nominal for the time of the year, though in some districts it has been above the average. In the south of the Colony, and in the Eshowe district of Zululand the rainfall has been good, but our Darnall (Victoria County) correspondent reports that in his District the rainfall during July was insufficient. Northwards of Port Shepstone (where the fall was good), in the districts of Polela, Richmond, Nel's Rust, Riet Vlei, etc., a sufficiency of rains fell, in some districts the fall being above the normal for the time of the year. These beneficial conditions seem to have been experienced eastwards, as well, running towards Greytown. As far as can be seen, in the upland districts of the Colony—that is to say, in the third belt—there has been little or no rain. There were one or two slight showers in the vicinity of Glencoe, an d in the Newcastle district slight misty rain was experienced for a short while on the high land.

More or less severe frosts have been experienced in most parts of the country, even on the North Coast, where a little damage was done during July to banana plants. Since the middle of July, however, the severity of the frosts, so far as the midland and coast belts are concerned, has abated, but in the northern districts they have continued more or less severe. As far as can be ascertained, little damage was done to crops by frosts during the month.

Contrary to original expectations, the mealie crop has not turned out to be such a record one as it gave promise of doing early in the year. In most parts of the Colony the crop has been reaped; and whilst in some districts—as, for instance, Port Shepstone, Riet Vlei, Greytown, St. Augustine's, Laing's Nek, etc.—the results have been good (some being much above the average, in other districts the yield has been low and not at all up to anticipation. In the majority of the districts the mabele crop is fairly good, and a yield above the average is promised. On the whole, the potato crop has not turned out a good one. In some districts—as, for instance, Greytown and Glencoe—complaints are forthcoming that the potatoes dug are of small size, owing, it is stated, to a fungus disease of the tops. Our Port Shepstone correspondent states that the sugar cane crop is a better one than was expected, owing to recent rains, but that it is still not a good one. Our correspondent at Imbizana writes that *Furcraea* is still being planted in that locality. In the Reit Vlei district mangolds, which are usually a good standing crop, are reported to be decaying, probably owing, it is stated, to sudden severe frosts on luxuriant autumn growth. The season for citrus fruits is apparently a good one, and bananas and pineapples are also doing well. Prices, however, have been low.

The market for cattle is still, of course, greatly affected by East Coast Fever; and in most parts of the Colony prices are very low or there are no sales effected at all. Reports from Nel's Rust, Glencoe and Newcastle, however, indicate a better state of things in those districts. Prices for cattle in the Glencoe district are advancing. In the Newcastle district the market is improving, buyers offering 30s. per 100 lbs. dead weight during July. In the vicinity of Port Shepstone, too, slaughter oxen have been sold at good prices. Prices for eggs and poultry, and butter and milk have, on the whole, been moderate. In some of the northern districts of the Colony the prices of butter and milk have been, of course, affected by East Coast Fever. In two or three districts—Newcastle and Vryheid, for instance—no locally produced milk has been sold. Supplies for Vryheid have been obtained from Mooi River and elsewhere. In the Glencoe district prices of milk and butter were about the same in July as last year: East Coast Fever having no apparent effect so far.

Our St. Augustine's correspondent reports that the Nqutu farms lately allotted are being actively occupied; and hay-making, orchard-planting, and building are in full progress.

South African Markets.

THE prices for live stock and animal and vegetable produce, realised on the Maritzburg, Durban, Johannesburg, and other South African markets during the month of July-August, have averaged as follows:—

NATAL.

PIETERMARITZBURG.—The Market Master has furnished the following prices realised on the Maritzburg market during the month:—

Live Stock.—Fowls, 1s 9d; ducks, 2s; turkeys, cocks 9s, hens 5s; guinea fowls, 2s 6d.

Animal Produce.—Butter, 1s 6d per ℔; eggs, 1s per doz.; pork, 5d per ℔; bacon, 6d per ℔; ham, 9d per ℔; lard, 7d per ℔; hides, 7d per ℔; honey, 6d per ℔.

Vegetable Produce.—Buckwheat, 12s per muid; beans, 18s per muid; earth nuts, 10s per muid; millet (grain), 10s per muid; hay, £1 10s per ton; Kafir corn, 10s per muid; mealies, 7s per muid; potatoes, 6s per muid; sweet potatoes, 3s per muid; peas, 18s per muid; sunflower seeds, 6s 6d per muid; barley, £2 10s per ton; oats, £2 per ton; bananas, 1s per 100; papaws, 3s per dozen; pineapples, 1s per dozen.

DURBAN.—The Market Master reports the following average prices realised on the Durban market during the month ended 15th August:—

Live Stock.—Sucking pigs, 4s; fowls, 2s; ducks, 2s 9d; turkeys, 8s 6d; guinea fowls, 3s 9d; rabbits, 8d.

Animal Produce.—Bacon, 7d per ℔; eggs, 1s 2d per dozen; butter, 1s 5d per ℔; pork, 4d per ℔; honey, 6d per ℔.

Vegetable Produce.—Kafir corn, 9s per muid; mealies, 7s 6d per muid; potatoes, 10s 6d per muid; sweet potatoes, 2s 6d per muid; turnips, £2 5s per ton; bananas, 9d per 100; naartjes, 1s per 100; oranges, 9d per 100.

TRANSVAAL.

Messrs. Lotter & Co., commercial brokers and commission agents, P.O. Box 2000, Johannesburg, report regarding prices realised on the Johannesburg market during the week ended 15th August:—

Live Stock.—Oxen (slaughter), £10 10s to £13 10s; oxen (dressed), per 100 ℔s, £1 17s 6d to £1 18s 6d; pigs, per ℔, live weight, 3d to 3½d; pigs, each, £1 2s to £4 10s; sheep (slaughter hamels), 18s to 21s 6d; sheep (dressed), per ℔, 5½d to 5¾d; fowls, 1s 6d to 3s; ducks, 2s 6d to 4s; guinea fowls, 3s 6d to 5s per brace; geese, 4s 9d to 6s 9d each; hares, 1s to 2s; turkeys, cocks (young) 7s to 10s, hens (young) 4s 9d to 6s.

Animal Produce.—Butter, 1s to 1s 3d per ℔; eggs, new laid 2s to 2s 3d, fresh 1s 3d to 1s 6d per dozen.

Vegetable Produce.—Barley, 8s 3d to 11s 3d per bag of 160 lbs net; bran, 7s 6d to 8s 9d per bag of 100 lbs net; beans (dry), 14s to 38s per bag of 200 lbs net; Kafir corn, 11s to 12s 9d per bag of 200 lbs net; lucerne, dry, 5s 6d to 6s 3d per 100 lbs; mealies: white 8s to 8s 6d, yellow 8s to 8s 3d, mixed 8s to 8s 3d, per bag of 200 lbs net; onions, 13s to 16s per bag of 120 lbs net; oats (seed), 8s 6d to 12s 9d per bag of 130 lbs net; peas (dry), 8s 9d to 10s 6d per bag of 200 lbs net; potatoes, 10s to 15s, (medium) 6s to 9s 9d, per bag of 160 lbs net; sweet potatoes, 3s to 9s per bag of 120 lbs net; rye, 11s 9d per bag of 200 lbs net; wheat, 17s to 18s per bag of 200 lbs net; manna, 3s to 4s 3d per 100 lbs.

CAPE COLONY.

The following information has been compiled from the latest available report of the Cape Superintendent of Agricultural Co-operation (for the week ended 16th August), appearing in the *Cape Times*:—

Grain, Cereals, etc.—Business has remained practically unchanged during the past week. Milling wheat, perhaps, has risen slightly; mealies have probably reached bottom prices, and it may be anticipated therefore that a little improvement will be recorded during the next few weeks. Lucerne and oathay remain firm, but it cannot be said that the outlook for large holders of oats is any too cheerful.

The following prices are recorded in respect of the week under review:—

Colonial wheat, per 200 lb, Caledon, firsts, 17s 3d to 17s 6d; Malmesbury, 17s 9d to 18s; Moorreesburg, 17s 6d to 17s 9d; Porterville-road, 18s 3d to 18s 6d.

Colonial oats, per 150 lb, Caledon, firsts, 8s to 8s 6d; seconds, 7s 6d to 7s 9d; Moorreesburg, 9s to 9s 3d; Malmesbury, 9s 3d to 9s 6d; Main Line, 10s 3d to 10s 6d.

Colonial barley, per 150 lb, Moorreesburg, 9s 6d to 9s 9d; Main Line, 10s to 10s 3d.

Colonial rye, per 100 lb, country stations, 17s to 17s 6d.

Kafir corn, per 200 lb, red 12s 9d to 13s, white 12s 6d to 12s 9d, ex stores, Capetown.

Bran, per 100 lb, 5s 9d to 6s, ex stores, Capetown.

Mealies, per 200 lb, Natal yellows, 12s to 12s 3d; O.R.C., small yellows, 13s 3d to 13s 6d; Natal white coast, 10s 6d to 10s 9d; Eastern Province Germans, 12s to 12s 3d; Eastern Province mixed, 11s 6d to 11s 9d.

Live Stock.—The demand for live stock still remains firm. The average prices for the week were:—Prime slaughter oxen, 37s 9d to 38s 6d per 100 lbs, dressed weight, Maitland; slaughter sheep, 40 to 54 lbs, dressed weight, 24s to 24s 3d, Maitland; fowls: small 1s 3d, medium 1s

6d to 1s 10d, large 2s to 2s 8d; ducks: medium 2s 6d, large 3s to 3s 3d; turkeys: hens 4s to 6s, cocks 6s 6d to 12s; geese, 2s 6d to 4s each.

Animal Produce.—Eggs: fresh 11s to 12s per 100, not guaranteed 8s to 9s 6d per 100. Market well supplied with eggs, and firm at prices quoted. Butter, best: wholesale 1s 4½d, retail 1s 9d per ℔; cheese: good Colonial Cheddar 10½d per ℔ (wholesale), Colonial Camembert 9s per doz; Colonial National cream cheese 4s 6d per doz.

Fruit and Vegetables.—Bananas, 14s to 22s per case of 800 to 1,000; bananas (choicest, ripe), 2s 6d to 4s per 100; pineapples (E.P.): Grahamstown 2s to 4s per doz, East London 1s to 1s 6d per doz, Natals 1s 6d to 2s 6d per doz; oranges (in very good demand this week, prices advanced about 20 to 25 per cent on last week), small 2s to 2s 6d per 100, medium 3s to 4s 6d, large 5s to 8s 6d per 100; naartjes (well supplied), small 9d to 1s 6d per 100, medium to large 2s to 6s; guavas, 9d to 3s per box of about 180 to 300; beans, 12s per bag; potatoes, first quality 13s to 15s per bag; second quality 7s to 12s per bag (good demand for first-rate Early Rose potatoes); French table potatoes now arriving in boxes, and affect the sale of Capes; sweet potatoes (in demand), 5s to 8s 6d per bag; onions, good quality 6s to 7s per bag; second quality 5s to 5s 6d; beans (Natal and sugar), 37s to 40s per bag.

KIMBERLEY.

Messrs. Jas Lawrence & Co., Ltd., reporting for the week ended 13th August to the Bloemfontein *Post,* state, with reference to the Kimberley market:—

Mealies are still offering very freely. There is a demand for good white Kafir corn. An advance in Colonial wheat, meal, and flour is anticipated. Demand for good sample barley forage plentiful. Onions have further declined during the week. Potatoes are firm for good samples. Inferior qualities difficult to place. Butter and eggs easier. Poultry fetching fair prices. Good demand for game. Plentiful supply of oranges and naartjes. Good general assortment of fresh vegetables. Little doing in live stock. No sale for pigs.

Live Stock.—Oxen (good) prime, 600 ℔s upwards, £9 to £14; cows (good) 450 ℔s upwards, £5 10s to £8; calves 5½d per ℔ dead weight; pigs, 100 (clean) 3d to 3½d per ℔ live weight; lambs, 30 ℔, 12s 6d to 14s; hamels, 40 ℔ to 45 ℔, 15s to £1; Cape sheep (good), 15s to £1; oxen (trek), £7 to £8; riding horses, £10 to £27 10s; draught horses, £10 to £25; mares, £10 to £25; guinea fowls, 2s to 4s each; hares, 1s to 2s 6d each.

Animal Produce.—Butter: fresh 1s to 1s 4d, second quality 9d to 1s per ℔; eggs, 1s per doz; hams and bacon, 5d to 8d per ℔.

Vegetable Produce.—Bran, 7s 3d to 8s per bag; barley, 7s 6d to 12s 6d per bag; forage: 6s to 6s 6d, inferior 3s 6d to 4s 6d per 100 ℔s; Kafir corn, S.A., 8s 6d to 10s 6d; mealies: yellow Colonial 8s 6d to 10s, white

Colonial 8s. 6d to 10s, mixed 7s to 9s; mealie meal: O.R.C. 9s 6d to 11s per 183 lb, white 10s to 11s 6d: Cape oats, 11s 6d to 12s per bag; lucerne hay, 4s 6d to 5s per 100 lbs; onions, 5s to 8s per bag; potatoes, 4s to 12s; wheat, 17s to 20s per bag; naartjes, 2s to 4s 6d per 100; oranges, 2s to 4s 6d per 100; pineapples, 1s 6d to 2s 6d per doz.

ORANGE RIVER COLONY.

Bloemfontein.

The following prices realised on the Bloemfontein market appeared in the Bloemfontein *Post* of the 13th August:—

Live Stock and Animal Produce.—Fowls, 2s to 2s 6d each; ducks, 2s 6d to 3s each; turkeys, 4s to 8s each; hares, 1s to 1s 6d each; fresh eggs, 1s to 1s 2d per doz; butter, 1s 3d to 2s per lb: mutton: per hind quarter 4s to 5s 6d, per fore quarter 2s 6d to 3s; pork, 4d to 6d per lb; beef, 4d to 6d per lb.

Vegetable Produce.—Chaff, 4s 9d to 5s per 100lb; Kafir corn, 10s per bag; mealies, 7s 6d to 8s 3d per bag; onions, 5s to 9s per bag; potatoes, 5s to 10s per bag; naartjes, 3s to 4s per 100; oranges, 3s to 4s 6d per 100; pineapples, 1s 9d to 2s per doz.

The Bloemfontein correspondent of *S.A. Trade Journal,* writing with regard to the O.R.C. mealie crop, says:—"Owing to the tremendous crops of mealies, the price is expected by some to go as low as 4s to 5s per bag."

Harrismith.

The following prices for produce were realised on the Harrismith market on the 14th August:—

Live Stock and Animal Produce.—Ducks, 1s 6d to 2s; fowls, 1s 6d to 2s 3d; pigeons, 6d to 9d (each); turkeys: cocks 6s to 6s 6d, hens 3s 6d to 4s 3d.

Vegetable Produce.—Forage, 6s to 8s 6d per 100 lbs; mealies, 6s 3d to 6s 9d per bag; oats, 7s to 9s per bag; potatoes, 8s to 10s per bag; bananas, 1s to 2s per 100; oranges, 2s to 5s per 100; pines, 1s 6d to 2s per doz.

A number of small glass butter churns, supplied by a Nova Scotia firm, have been under trial for about twelve months by various people in Barbados, and they are reported to be "most convenient and effective." The churns are supplied in four sizes, from 1 quart to 4 quarts, by Messrs. Crump & Perrier, 25, Barrington Street, Halifax, Nova Scotia.

The Oversea Maize Market.

THE POSITION IN JULY.

THE following information regarding the oversea maize market has been compiled from *Beerbohm's Evening Corn Trade List.*

Notwithstanding the large shipments of maize to Europe (2,685,000 qrs. during the three weeks ended 5th July, including 1,640,000 qrs. to Continental ports, as compared with 1,450,000 qrs., including 835,000 qrs. for the Continent, last year) the market showed more firmness, partly in sympathy with the upward movement in wheat and partly owing to the continued active Continental demand, which is, indeed, the feature of the season. Up to 23|10½ per 492 lbs. was paid for Gal Fox steamer, shipment by 15th August, 23/6 for La Plata loading, and 23/4½ for a steamer well on the way. From Roumania and the south-east of Europe generally the reports regarding the growing crops continued favourable on the whole, but the American crop did not appear to have had a very favourable start. During the week ended 5th July, Argentina was still shipping only relatively moderate quantities.

During the following week shipments were again very large, although rather smaller than in the previous week. The cargo market continued firm up to Monday, 8th July, and prices advanced 3d. per qr., a fair number of cargoes changing hands on Friday, Saturday and Monday, but the market then became quieter, but became quite firm again on Thursday, with an improved demand; the top prices paid were 24/3 for Foxanian, August shipment, 23/9 for Yellow La Plata afloat, and 23/10½ for August/September shipment. Parcels closed rather easier, 23/10½ having been accepted for Odessa loading, after 24/- had been paid. During the week in question Roumanian crop reports were still favourable on the whole. The prospects of the American crop were for one of 2,650,000,000 bushels, against last year's actual yield of 2,927,416,000 bushels. The Argentine shipments that week were rather smaller, amounting to 171,500 qrs., making the total to the 12th July 1,444,500 qrs., against 3,522,000 qrs. in the same time last year, and 2,940,000 qrs. in 1905.

The *Corn Trade List* of the 26th July announced that the maize market had at last been "decidedly affected by the record shipments both to the United Kingdom and Continent." Prices declined during the week ended 26th July sixpence to a shilling per quarter. As low as 22/9 had been accepted for La Plata steamer afloat and 23/- for 15th August/September shipment, whilst Dar/Gal/Fox steamer afloat sold at

22/7½ per 480 lbs. Since June 1st (seven weeks) the shipments, especially from Roumania and Russia, had been "truly prodigious enough to try any market." "It is not easy to suggest when the shipment from Roumania and Russia will show any decided falling off." comments the *List* of the same date, " but it is a fact that about eight million quarters have already been shipped since last September, whilst the surplus has been estimated at about 13 to 14 million qrs. American shipments are fair for the time of year, being doubtless attracted by the relatively high prices, but the new crop is by no means in such a favourable condition as in either of the three previous years, although this week's cables denote some improvement." From Argentina less than half of last year's rate of exports since May 1st had, so far, been witnessed, but fairly liberal quantities were being moved that week, and the visible supply was equal to that of last year, viz., 80,000 tons. According to a cable to the *Corn Trade List*, however, the quality and condition of the supplies were very variable, thus hampering business.

The general statistical position carried up to date (26th July) was as follows:—

	1907—qrs.	1906—qrs.	1905—qrs.
On passage to U.K.	990,000	1,020,000	1,025,000
" " Cont.	1,630,000	1,290,000	1,060,000
Imports into U.K. for the 29 weeks ending July 20	6,385,000	6,101,750	5,808,500
Visible supply in U.S. (*Bradstreet's*) ...	1,877,600	1,346,000	1,248,700
	1906-7	1905-6	1904-5
American crop	340,000,000	316,000,000	285,000,000
	1907.	1906.	1905
New York, Spot	61c	58¼c	62½c
Mark Lane, Mxd. Am. ex-ship ...	23/6	22/3	23/9

SHIPMENTS OF MAIZE TO EUROPE FROM JAN. 1 TO DATE.

	1907. U K *	1907. Cont.	1906. U.K.*	1906. Cont.	1905. U.K.*	1905. Cont.
	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.
America	2,804,000	3,297,000	3,201,000	5,082,000	3,335,000	4,587,000
Argentine	1,469,000	1,015,000	2,788,000	2,271,000	2,802,000	1,696,000
Russia	1,025,000	1,489,000	123,000	153,000	166,000	374,000
Danube, etc. ...	1,487,000	2,784,000	203,000	839,000	122,000	133,000
Total ...	6,785,000	8,585,000	6,315,000	8,345,000	6,425,000	6,790,000

* Includes shipments for orders.

Coal and Labour Return.

Return of Coal raised and Labour employed at the Natal Collieries for the month of July, 1907:—

Name of Colliery.	Average Labour Employed.									Output.	
	Above Ground.			Below Ground.			Unproductive Work.*				
	E.	N.	I.	E.	N.	I.	E.	N.	I.	Tons.	Cwt
Natal Navigation ..	30	74	220	19	248	225	—	—	—	23,336	19
Elandslaagte	14	21	268	17	180	460	2	4	2	16,909	8
Dundee Coal Co. ..	11	10	194	9	30	293	4	11	14	15,204	6
Glencoe, Natal ..	13	98	80	11	477	14	—	—	—	15,145	10
Natal Cambrian ..	12	37	134	8	265	81	3	4	2	12,021	4
South African	10	11	95	11	225	50	5	29	51	10,428	7
St. George's	16	115	122	12	186	109	2	8	—	10,269	0
Durban Navigation ..	20	119	43	10	233	38	—	—	—	9,164	0
Newcastle	8	42	22	6	280	2	2	6	—	7,304	14
Natal Steam Coal Co. ..	1	43	4	2	150	2	1	4	1	3,239	18
West Lennoxton ...	5	1	65	2	29	97	—	—	—	2,975	0
Central	4	65	11	6	230	9	—	2	—	2,644	14
Ramsay	2	12	35	5	125	100	3	5	8	2,480	14
Talana (Natal) ..	2	10	13	2	26	30	1	3	6	951	10
Woodlands	2	8	4	1	9	5	—	—	—	253	0
Vryheid§	1	3	—	1	4	—	—	—	—	32	0
Dumbi Mountain† ..	2	2	—	—	—	—	—	—	—	6	0
Signal Hill	—	—	—	—	—	—	1	1	—	5	0
Vaal Bank§	—	—	—	—	5	—	—	5	—	5	0
Totals	153	671	1,310	122	2,702	1,515	24	82	84	132,376	10
Corresponding month, '06	149	654	1,221	120	2,309	1,525	51	217	229	92, 07	9

* Cost charged to Capital Account. † Includes June Return. § June Return.

Maritzburg,
7th August, 1907.

CHAS. J. GRAY,
Commissioner of Mines.

Return of Coal bunkered and exported from the Port of Durban for the month of July, 1907:—

	Tons.	Cwt.
Bunker Coal*	64,955	10
Exported to:—		
East London	1,444	5
Port St. John's	1	0
Algoa Bay	2,940	1
Mossel Bay	504	12
Cape Town	16,561	1
Total	86,406	9

* Including H.M. Warships.

W. L HOWE,
for Collector of Customs,

Custom House, Port Natal,
1st August, 1907.

Return of Farms at Present under Licence for Lungsickness and Scab.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
A. P. Craw ..	Ladysmith .	Scab	Ingenga	Roodepoort
		,,	P. Nicholson ..	Nicholson's Nek
		,,	H. Bowes ..	Zaarfontein
		,,	Mabela	Roodepoort
		,,	J. Pepworth ..	Eenvogel Vlei
		,,	D. Sparks ..	Berg View
		,,	W. Wright ..	Maggiesdale
		,,	G. J. McDouling ..	Waterford
		,,	W. Anderson ..	Netherby
		,,	Jimze	Rossboom
		,,	Kantool Zuma ..	,,
		,,	E. Moreland ..	Ruit Kuil
		,,	Mape wana ..	Roodepoort
		,,	J. C. Buys ..	Ruit Kuil
		,,	W. M. Buys ..	,,
		,,	Makantangwa ..	Rossboom
		,,	J. J. Geldenhuys ..	Blauw Bank
		,,	F. Colling ..	Klipdal
		,,	F. T. Hyde ..	Himsley
		,,	I. J. M. Buys ..	Ruit Kuil
		,,	Talwani	Twijflaar
		,,	J. Stevens ..	Schoemansdal
		,,	H. O. Hyde ..	Allen Park
J. R. Cooper ..	Nkandhla & Nqutu	,,	Amangayehlezyo ..	Mangene
		,,	Halangana ..	Nqutu
		,,	L. Nene ..	,,
		,,	L. Rheuga ..	Dalala
		,,	T. Nxumalo ..	Macebo
		,,	Mkungeni ..	Jojoseni
		,,	A. Mbala ..	Blood River
		,,	Vinuv e Libuna ..	Nkandi
		,,	Luhienia Ka etc. ..	Magala
		,,	Sotshata Ka ..	Nondweni
		,,	Strinera Ka Yabya	Tilizi Hill
		,,	Liyo Ka Norhayi ..	Mapaswaneni
		,,	Komana Ka Makaskela	Siluyela
		,,	Hlanganiza Ka [illegible]	Nigasini
		,,	Ngcongcoya Ka Pepa	,,
S. A. Brown ..	Underberg ..	,,	J. A. Stone ..	
		,,	T. de C. Arbuckle ..	Kerridge
		,,	B. Phipson ..	Strathcampbell
		,,	M. Fraser ..	Winterhoek
		,,	R. C. Gold ..	Woodend
		,,	J. R Royston ..	Greenend
		,,	J. van Whye ..	Silburn
		,,	F. A. Hathorn ..	Sau uana
		,,	T Palframan ..	Slogoma
A. B. Koe ..	Portion of Estcourt	,,	H. J. Hatting ..	Servitude
		,,	J. J. B. Cooke ..	Estcourt
		,,	Sclander Bros. ..	Kelvia
		,,	H. L. Frances ..	Rietfontein
		,,	Bacon & Kelly ..	Winterton
		,,	J. van der Merwe ..	Excelsior
A. J. Marshall ..	Dundee	,,	R. J. du Bois ..	Giba
		,,	J. W. de Bruyn ..	Rooifontein
		,,	C. M. Vermaak ..	Paddock
		,,	L. W. Meyer ..	Langverwacht
		,,	A. L. Jansen ..	Strathearn
		,,	J. O. Nel ..	Earnscliffe
		,,	A. C. Vermaak ..	Sigtuna
		,,	T. C. Vermaak ..	Harriotdale
		,,	H. Vermaak ..	Paddock
		,,	P.J. & H.J. Jordaan	P estweek
		,,	P. Mshabi ..	West Port
		,,	G ga and others ..	Carolina
		,,	Wade Bros. ..	Stanton
		,,	H. Whysall ..	Grantham

RETURN OF FARMS AT PRESENT UNDER LICENCE FOR LUNGSICKNESS AND SCAB—*continued*

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
E. Varty	Western Umvoti	Scab	W. J. Slatter	Holm Lacy
		,,	C. A. Charlwood	Craigieburn
J. J. Hodson	Ptn of Lion's River	,,	R. Spiers	Moyeni
R. Mayne	Krantzkop	Lungsickness	Maqamganse	Loots Hoek
		,,	Uqupu	Myoniezwe's Locat'n
		,,	Ndabane	,,
		,,	S. Johnson & Co.	Inadie Store
		,,	Ndabane	Myoniezwe's Locat'n
		,,	Natives	Myoniezwe's Locat'n
		,,	H. L. van Rooyen	Krantzkop
		Scab	S. C. Van Rooyen	Smal Hoek
A. H. Ball	Weenen	,,	E. E. Robinson	Mona
		,,	L. C. Kinsman	Mount Moriah
		,,	Deya	Lilyfontein
		,,	Vunyo and others	Elena Berg
		,,	Gundlane	Gretna Green
G. Daniell	Vryheid	,,	Nkanyeze	Mooiplaats
		,,	Hlabalan	Nootgedacht
		,,	P. H. Tredoux	Bellvue
		,,	Myamana	Welgevrede
		,,	D. Coetzee	Doornhoek
		,,	Mabekashen	Nooitverwacht
		,,	Funawayo	Nooitgedacht
		,,	J. V. Grening	Hartebeestelaagte
		,,	Maboshwa	Onverwacht
		,,	Moolie	Beaufort
		,,	Mpundhla	Onverwacht
		,,	B. Balladon	Schaapkopje
		,,	Zimbata	Nooitgedacht
R. Mayne	Eastern Umvoti	Lungsickness	C. van Rooyen	Boschfontein
		,,	Nkabi and others	Loots Hoek
		Scab	P. R. Botha	Olivefontein
		,,	J. A. Nel	Oakland
		,,	F. W. Spencer	Impanza
		,,	J. Oliver	Greytown Town Lds.
		,,	G. J. Maritz	Fair View
J. Button	Portion of Estcourt	,,	Jim	Rensburg Spruit
		,,	C. C. Bisshoff	Waterhoek
		,,	W. McKie	Town Lands
E. Parkinson	New Hanover	,,	Ndabeni and Jim	Location
		,,	H. Portmann	Strijdgewon
		,,	Madigezela	Location
		,,	Chief Gwaimana	,,
A. Hair	City and Umgeni	,,	Umbabana	Zwaartkop Location
		,,	Ungola	Edendale
		,,	Unsizwa	Zwaartkop Location
		,,	Umveli	,,
		,,	Umsutu	,,
		,,	Lutye	,,
		,,	Ndudane	Bishopstowe
D. M. Pfaff	Utrecht	,,	Thomas	Groot Vlei
		,,	Vauns and Lamoen	,,
		,,	P. Pretorius	Geluk
		,,	Major and others	Spart espruit
		,,	Nkanda	,,
		,,	A. Wright	Rhenosterfontein
		,,	C. Halforty	The Falls
J. Stewart	Bergville	,,	J. W. Mann	Castle View
		,,	J. W. Stewart	Bergville
		,,	M. Radford	De Wet Stroom
		,,	J. Mortimer	Wy Kom
R. Wingfield Stratford	Newcastle	,,	S. James	Fair View
		,,	W. Steel	Botha's Pass
		,,	G. W. Thomas	Kingston
		,,	D. Keay	Churnwood
C. E. Walker	Umsinga	Lungsickness	Numgawana	Umsinga
J. [illegible] Speirs	Impendhle	Scab	Pindu, Vete & Sobuon	Furth
H. C. Jarvis	Ixopo	,,	L. Foster	Alicedale
H. C. Owen	Melmoth	,,	Chas. Hunsley	Vlakbult

MANGE IN HORSES EXISTS AS UNDER.

Name.	District.	Name.	District.
W. E. Oates	Bergville	Meleli	Polela, Location No. 2
Mboyea	Bergville.	Genegwa	,, ,,
Nseleni	Markwa Mountain.	H. Wilkins	Vryheid, Little Hlobome
Pongwana	Upper Umkomanzi, Crown Lands		

Brands Allotted to Infected Magisterial Divisions.

The following is a list of the brands which have been allotted to the several infected Magisterial Divisions: Durban County, D. 2; Alexandra County, A. 2; Lower Tugela, T. 2; Mapumulo. S. 2; Inanda, B. 2; Umsinga, U. 2; Dundee, X. 2; Vryheid, V. 2; Ngotshe, H 2; Paulpietersburg, P. 2; Nongoma, G. 2; Mahlabatini, L. 2; Ndwedwe, N. 2; Weenen County, W. 2; Umvoti, F. 2; Hlabisa, K 2; Eshowe, E. 2; Ladysmith R. 2; Babanango, O. 2.

Pound Notices.

NOTIFICATION is contained in the *Government Gazette* of the sale, unless previously released, of the undermentioned stock on the dates specified:—

On the 4th September:—

Charlestown.—(1) Bay gelding, hog mane, white spots on back, slit left ear, height about 14 hands, aged, no brands. (2) Bay gelding, white spot on back, both hind fetlocks white, branded B.U right hip, about 14·2, aged.

Glenton (Klip River Division).—Two black cows, one branded S on off hind leg, right ear end cut straight off, and half moon; the other with right ear cut straight off at end, and half moon.

Hatting Spruit—Young white Yorkshire sow, no ear marks.

Howick.—(1) Red cow, aged, notched in both ears, and tips off, no brands. (2) Two two-year-old oxen, one black, one black with white on flank.

Impendhle.—Chestnut yearling foal, white hind feet, in poor condition. Reported by the Stationmaster, Elands Kop, C.N.R., as too wild to be driven to the Pound.

Krantzkop—(1) White ram, no brands. Probable value, 10s. Impounded on the 30th July, 1907, by Uboy, a native of Hlangabeza Location. Supposed to be the property of some native. (2) Running on Mr. L. M. J. Van Rooyen's farm, "Sweet Home," and too wild to be driven to the Pound: Bay stallion, no brands. Probable value, £10. Reported on the 31st July, 1907, by Mr. L. M. J. Van Rooyen, "Sweet Home," Krantzkop. Supposed to be the property of some native.

Melmoth.—She-goat, about nine months old, black with white spots. Value 5s.

Meran (Waschbank Division).—Eight well-bred Angora goats, 6 ewes, 2 lambs, no brands, various ear marks on both ears. very long hair. Impounded by William Hattingh, of "Gelegenfontein," Wessels Nek.

Mountain View (Newcastle Division).—(1) Brown mare, near front foot white, branded like O near thigh. (2) Brown filly foal, near hind foot white, no visible brand.

Redmain (Ingogo).—Horse, dark chestnut, branded 36, a bad sore back, very old, aged about 20 years. Impounded on the 14th July.

Serpentine (Newcastle Division).—(1) Kafir goat, ram, no marks or brands. Probable value, 5s. Impounded on the 3rd July, 1907, by K. Adendorff. (2) Two Kafir goats, kind of merinos: (1) ewe, right ear swallow tail and hole through it, left ear slit in back, square out of front; (2) slit in right ear, and swallow tail in left.

Utrecht.—(1) Dun cow, white on belly, branded L D near hip, slit out near ear. Probable value, £3. (2) Black and white heifer calf, no marks or brands. Probable value, about 15s. (3) Black cow, two years old, white on belly, slit out near ear, no brands. Probable value, about £3. (4) Red bull calf, about 18 months old, slit out near ear, no brands. Probable value, about £1.

On the 18th September:—

Finchley (Ixopo Division).—Bay gelding, flea bitten, lately clipped, mane has been hogged some time ago, black points and muzzle, had bags sewn together on as a blanket, and also halter.

Hope Farm (Newcastle Division).—(1) Donkey, mare, white, with mouse coloured foal, no brands or ear marks visible. (2) Donkey, mare, mouse coloured, no brands or ear marks. (3) Donkey, gelding, mouse coloured, no brands or ear marks.

Howick.—Running on the farm "Woodland," and reported by Mr. H. Stedman as too wild to be driven to the Pound: Bay mare, long tail and mane, two white feet, slight blaze down face, no brands visible.

Impendhle.—Two merino ewes. branded Y.T. on near side.

Loteni (Impendhle Division).—Brown gelding, long mane and tail, aged, slit in near ear, no brand visible.

New Hanover.—Running on the farm "Ambleside," New Hanover, and reported by Mr. C. C. Comins as being too wild to be driven to the Pound: Black and white heifer, 2 years old, slit in each ear, indistinct brand on right leg.

Serpentine (Newcastle Division).—(1) Kafir goat, ewe, right ear hole in centre, and swallow tail, left ear slit in back, square out of front. (2) Kafir goat, ewe, slit in right ear, left ear swallow tail.

Utrecht.—Chestnut mare, age about 2 years, star on forehead, long mane and tail, no marks or brands. Probable value, about £6.

Vergelegen (Vryheid Division).—(1) Dark brown mule, mare, freckled blaze, and three white hoofs, branded left side of neck indistinct B 173, left hind quarter indistinct ɑ·I, right hind quarter f over inverted Y, indistinct harness marks, in fair condition, long tail and mane, above 8 years old. Impounded with halter on. (2) Cream coloured mule, mare, light mane and tail, long, indistinct star, branded on right hind quarter, f over inverted Y indistinct, heart on right hip, on left side of neck 166 indistinct, on right shoulder O, indistinct, harness marks, above 8 years old, in fair condition. Impounded 22nd July, 1907.

It is notified that the Pound established at "Good Luck," Dronk Vlei, has been abolished, Mr. J. Anderson Speak having resigned his appointment as Keeper thereof.

A Pound has been established at Creighton, Ixopo Division, of which Mr. W. R. Banger has been appointed Keeper.

Diamond Drilling.

SOME of the departmental diamond drilling plants are at present disengaged and available for hire for boring for either minerals or water. Particulars as to terms of hire may be obtained from the undersigned.

CHAS. J. GRAY,
Commissioner of Mines.

Meteorological Returns.

Meteorological Observations taken at Government Stations for Month of July, 1907.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.).				RAINFALL (IN INCHES).					
	Means for Month.		Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heav'st rainfall in 1 day.		Total for Year from July 1st, 1907.	Total for same per'd from July 1st, 1906.
	Maximum	Minimum					Fall.	Day.		
Observatory ..	74·0	52·2	83·1	46·1	·16	5	.06	30th	·16	·23
Stanger ..	74·3	51·9	86	47	1·07	7	·46	2 th	1 07	·25
Verulam ..	74·7	48·7	85	43	·25	3	·10	19 & 26	·25	·06
Greytown ..	70·3	34·7	77	24	·19	2	·13	19th	·19	·05
Newcastle .	69·6	32·5	74	24	Nil	—	—	—	—	—
Ndwedwe ..	64·9	53·6	73	47	·45	3	·30	20th	·45	·15
Estcourt ..	68·9	32·2	76	24	·00	1	·00	20th	·00	—
Mid-Illovo ..	72·0	47·5	88	38	·47	4	·37	19th	·47	·22
Port Shepstone ..	73·7	50·0	81	45	·89	3	·47	20th	·89	·43
Umzinto ..	69·9	46·5	73	44	·20	1	·20	29th	·20	·29
Richmond ..	71·6	39·7	81	31	·40	2	·28	19th	·40	·49
Maritzburg ..	73·0	37·3	83	28	Nil	—	—	—	—	·01
Howick ..	63·5	31·6	78	22	·34	2	·19	19th	·34	—
Dundee ..	65·0	40·8	72	34	Nil	—	—	—	—	—
Weenen Gaol ..	74·3	23·8	84	21	Nil	—	—	—	—	—
Impendhle ..	69·9	31·4	74	26	·21	1	·21	19th	·21	—
New Hanover ..	70·4	35·1	80	25	·29	3	·22	18th	·28	·03
Nongoma ..	70·3	43·2	78	34	Nil	—	—	—	—	·04
Nqutu ..	65·4	42·5	71	35	·00	1	·00	27th	·00	·00
Umlalazi ..	73·4	39·1	82	34	1·82	5	·32	19th	1·82	—
Melmoth ..	71·2	47·7	83	40	.06	3	·04	20th	·06	·35
Ubombo ..	75·1	57·4	85	45	·14	2	·12	19th	·14	·18
Point ..	—	—	—	—	·32	6	·22	18th	·32	·44
Camperdown ..	75·9	44·1	86	35	·12	2	·07	19th	·12	·22
Charlestown ..	62·6	26·4	70	17	Nil	—	—	—	—	—
Mahlabatini ..	75·9	45·2	84	40	Nil	—	—	—	—	·23
Empangeni ..	75·3	47·4	89	38	·65	6	·38	4th	·65	—
Bulwer ..	—	—	—	—	·22	4	·12	19th	·22	—
Imbizana ..	—	—	—	—	1·03	4	·50	20th	1·03	—

Meteorological Observations taken at Private Stations for Month of July, 1907.

STATIONS.	TEMPERATURE (in Fahr. Degrees)		RAINFALL (in inches).					
	Maximum for Month	Minimum for Month.	Total for Month.	No. of days.	Heaviest Rainfall in one day.		Total for Year from July 1st, 1906.	Total for same period from July, 1905.
					Fall.	Day.		
Nottingham Road	—	—	0.33	1	0·33	19th	0·33	—
Adamshurst (Wm. Adams)	84	34	0.07	1	0·07	19th	0·07	0·25
Hilton	78	31	0·23	2	0·20	19th	0·23	Nil
Mount Edgecombe (Natal Estates) ..	86	45	0·35	4	0·15	20th	0·35	·12
Cornubia ,, ..	—	—	0·26	—	—	—	0·26	·17
Milkwood Kraal ,, ..	—	—	0·35	—	—	—	0·35	·09
Blackburn ,, .	—	—	0·49	—	—	—	0·49	·09
Saccharine ,, ..	—	—	0·31	—	—	—	0·31	·07
Equeefa (W. Hawksworth)	85	48	0·15	3	0·06	20th	0·15	·28
Cedara—Hill	72	29	0·13	1	0·13	19th	0·13	Nil
,, Vlei	78	19	0.15	1	0.15	19th	0.15	—
Winkel Spruit	77	44	1.64	5	1.52	30th	1.64	·14
Branxholme	—	—	0·71	2	0·52	19th	0.71	·06

East Coast Fever.

SLAUGHTER CATTLE.

THE Department of Agriculture has erected abattoirs adjoining the Government Cold Stores, Maritzburg, where people will be able to forward cattle from clean and infected areas for slaughter. Killing, chilling, and freezing can be undertaken by the Department if desired, and arrangements can also be made for the forwarding by rail of meat intended for sale in markets outside Maritzburg. This will enable farmers, who wish to dispose of their stock for slaughter and find a difficulty in so doing, to have their animals killed in Maritzburg and the meat forwarded to Durban or any other market. The abattoirs will be under the personal supervision of Mr. A. R. Burford, the Manager of the Government Cold Stores, who is thoroughly experienced in this particular class of work.

The provisional abattoir charges are :—

Cattle per head	1s., with a minimum of £3 per killing space per month.
Sheep	1½d. each.
Pigs...	3d. ,,
Chilling and Freezing Beef, 1st week	1s. 3d. per qr.
,, ,, 2nd ,, ...	1s. ,,
,, ,, Remaining weeks ...	9d. ,,
Sheep ... ... per week	3d.
Pigs ... ... ,, ...	6d.

Charges for killing and handling Cattle, and placing same in Cold Storage, if required, or meat to be taken away by customer from hanging-room :—

Cattle, per head	4s. each (including abattoir fee).
Sheep	6d. ,,
Pigs	1s. ,, up to 200 lbs.
,, ...	1s. 6d. each, over 200 lbs. & up to 300 lbs.
,, ...	2s. ,, over 300 lbs.

W. A. DEANE.
Minister of Agriculture.

Department of Agriculture, Maritzburg,
9th April 1907.

Central Experiment Farm, Cedara.

IN order to minimise interference with the general course of work on the Central Experiment Farm, Cedara, it has been found necessary to set apart one day of the week, namely, Friday, as a visitors' day.

Arrangements will accordingly be made on that day for receiving visitors and showing them round the Farm. A trap will be at Cedara Station to meet the up 9.50 a.m. train ; and if intending visitors from up-country will give notice to the guard at Howick Station, on their way down a trap will be sent to meet the train which passes through Cedara at 11.2 a.m. Visitors travelling by other trains will also be met if they will previously make arrangements by writing.

On other than the visitors' day, visitors may be received by appointment, but special attention cannot be guaranteed in regard to their being shown round.

With reference to the visits of Agricultural Associations, in view of the fact that the cost of railway tickets is in future to be borne by the Department of Agriculture, and that the catering involves such a strain upon the resources of the School of Agriculture, it has been decided to limit the number of delegates from any one Association to 25 per cent. of its membership. At least 14 days' clear notice must be given by Associations, so that there may be time to make all necessary arrangements.

All communications in connection with proposed visits to the Experiment Farm should be addressed to the Director of Experiment Stations, Cedara.

W. A. DEANE,
Minister of Agriculture.

27th April, 1907.

Executives of Farmers' Associations.

ALFRED COUNTY FARMERS' ASSOCIATION.—President: A. G. Prentice, J.P. Vice-Presidents: C. Knox, J.P., L. T. Trenor. Committee: C. M. Etheridge, E. J. Gray. W. B. Rethman. H. W. F. Rethman, C. A. Howell. R. E. H. Fann, J.P., W. T. J. Gold, Dr. Case, Revd. S. Aitchison. Hon. Treasurer: H. C. Hitchins. Secretary: T. Tribe.

BOSTON FARMERS' ASSOCIATION.—President: Thomas Fleming. Vice-President: J. Geldert. Hon. Secretary and Treasurer. W. J. Fly.

CAMPERDOWN AGRICULTURAL SOCIETY.—President: John Moon, C.O.; Vice-Presidents: A. N. Kirkman, J.P., and G. Swales; Hon. Secretary: — Wilson.

CAMPERDOWN AND DISTRICT FARMERS' ASSOCIATION.—President: John Moon. Vice-President: F. N. Meyer. Hon. Sec.: L. Baker.

DUNDEE AGRICULTURAL SOCIETY.—President: F. Turton, Esq., J.P. Vice-Presidents: The Minister of Agriculture, the Mayor of Dundee, Messrs. A. L. Jansen, H. Ryley, and W. Craighead Smith, J.P. Hon. Secretary and Treasurer: J. McKenzie. Committee: D. C. Pieters, D. Macphail, W. H. Tatham, H. Baasch, M. Taylor, J. A. Landman, N. F. Hesom, A. W. Smailie, C. W. Whysall, W. Craig, C. G. Willson, T. P. Smith, J. Campbell, J. B. Duboisee. W. R. Quested, A. Grice, D. Meumann, W. J. H. Muller, J. E. Caldwell, E. C. Saville, C. M. Meyer, A. J. Oldacre.

DURBAN COUNTY FARMERS' ASSOCIATION.—Patron: J. H. Colenbrander. President: J. McIntosh. Vice-Presidents: H. Westermeyer, R. R. McDonald. Committee: F. R W. Bœhmer, G. Compton, H. Freese, W. Freese, W. Gillitt. H. W. Kœnigkræmer, H. W. Nichols, F. Schæfermann. Hon. Sec. and Treasurer: Frank J. Vo ek.

ESHOWE DISTRICT FARMERS' ASSOCIATION.—President: J. R. Pennefather. Vice-President: C. F. Adams. Secretary: T. Parkins. Treasurer: W. T Brockwell.

GOURTON FARMERS' ASSOCIATION.—President: W. C. Stockil, Esq., J.P. Vice-President: M. Sandison, Esq Hon. Secretary and Treasurer: Frederick B. Burnard, Esq.

HATTING SPRUIT FARMERS' ASSOCIATION.—President: Wm. Craig Vice-President, J. Campbell; Committee: J. J. S. Maritz, G. De Waal, H. J Hearn, Thos. Brookes, N. Glutz, H. Glutz, W. A. Quested, J. A. Brookes, W. J. Hislop, Thos. Dewar, J. Humphries, W. H. Tatham, A. E. Norman, D. W. H. Tandy; Hon. Secretary and Treasurer: R. J. Hearn.

HIMEVILLE AGRICULTURAL SOCIETY.—President: Henry C. Gold, Dartford, Polela. Vice-Presidents: W. Little, R. Justice, G. Malcolm. Executive Committee: G. Malcolm, W. S. Johnston, P. McKenzie, W. Little, G. Royston. Hon. Secretary and Treasurer: Thos. E. Marriott, Brookdale, Polela. Assistant Secretary: F. W Fell, Ericksburg, Polela.

HOWICK FARMERS' ASSOCIATION.—Chairman, Thos. Morton; Vice-Chairman, M. A. Sutton; Hon. Secretary and Treasurer, A Clark.

INGOGO FARMERS ASSOCIATION.—President: Angus Wood, J.P. Vice-Presidents: G. A. Fimstone and J. Browning. Hon. Secretary and Treasurer: C. Watt.

IXOPO AGRICULTURAL SOCIETY. — President: W. Arnott. Vice-Presidents: F. L. Thring, J.P., John Anderson, C. E. Hancock, J.P. Committee: W. K. Anderson, J.P., Thos Allen. J. C. Auld, H. D. Archibald, F. S. Beningfield, S. Boyd, F. E. Foxon, R.M., Wm. Foster, Jas. T. Foster, Geo. E. Francis, L. Gray, A. M. Greer, J.P., J. R. Greer, Wm. Gold, Jno. Gold, H. A. Hill. C. F. Harriss, A. E. Keith, R. Kennedy, Geo. Martin, W. Oakes, L. J. Phipps, T. F. Remfry, J. W. Robinson, Jas. Schofield, M.L.A., A. Stone, W. R. Way, G. C. Way, A. H. Walker, M.L.A, J. L. Webb (F.R.C.V.S.). Hon. Sec: R. Vause. Hon. Ass. Sec.: C. K. D. Beales. Hon. Treasurer: T. Arnott.

IXOPO FARMERS' ASSOCIATION.—President: A. E. L Keith, Ixopo. Vice-Presidents: Geo. Martin, Claybrooke, Ixopo; A. Kirkman, Lufafa, Ixopo. Hon. Secretary and Treasurer: Geo. E. Francis, Morningview Ixopo. Delegates to Farmers' Union: President and James Foster. Committee: F. Remfry. R. Vause

C. E. Hancock, John Anderson, R. Greer, W. Oakes, D. Campbell, G. C. Way, James Foster.

KLIP RIVER AGRICULTURAL SOCIETY.—President: Herman Illing; Vice-Presidents: J T Francis, J. G. Bester, W. Pepworth. Auditor: J. T. Francis. Esq. Secretary: E. Scott, F.I.A. (Lond.). Executive Committee: A. Brink, D. Bester. J. Farquhar, C.M.G., W. C. Hattingh, J. G. Hyde, Trev. Hyde, A. L. Horsley, W. Freer, L. A. Leonard, H. Nicholson, J. H. Newton, J. T. Sandalls, W. H. Roberts, H. C. Thornhill.

LION'S RIVER DIVISION AGRICULTURAL SOCIETY.—President: Graham Hutchinson; Vice-President: H. Nisbet; Executive Committee: H. Nisbet, M. A. Sutton, A. J. Holmes, J. Humphries, Jno. Pole, and W. A. Lawton; Auditor: W. J. R. Harvard; Hon. Sec. and Treasurer: Arthur F. Dicks, P.O. Box 1, Howick.

LITTLE TUGELA FARMERS' ASSOCIATION.—President: F. van de Waal. Vice-President: F. G. King. Secretary and Treasurer: H. L. Frances. Auditor: A. D. Buchanan. Committee: R. P. Summersgill, F. W. Holmes, J. P. Wepenaar, J. J. Harding, Max Cameron.

LOWER TUGELA DIVISION ASSOCIATION.—President: T. G. Colne, brander. Vice-President: Lieut. Col. F. Addison. Hon. Secretary and Treasurer: H. Curtis Smith. Committee: A. S. L. Hulett, A. E. Foss G. Stewart, J. B. Hulett.

LOWER UMZIMKULU AGRICULTURAL ASSOCIATION.—President: D. C. Aiken. J.P. Vice-Presidents: H. Albers and C. H. Mitchell, J.P Hon. Secretary and Treasurer: W. J. Plows. Committee: C. Manning, J. W. Aiken, W. G. Camp, T. F. Godwin, J. Hutton, H. Norden and A. Borchard. Hon. Secretary, Show Committee: J. W. Aiken. Show Committee: A. E. Collison, A. Borchard, F. Knoop, A. Ring, H. F. Voigts, J. Hutton, C. Manning, A. J. Lugg and H. Albers. Hon. Auditor: J. W. Aiken.

MID ILLOVO FARMERS' CLUB.—Chairman: L. G. Wingfield-Stratford J.P. Vice-Chairman: B. B. Evans. Hon. Secretary: J. W. V. Montgomery. Assistant Hon Secretary: S. C. Phipson. Hon. Treasurer: Jos. McCullough.

MOOI RIVER FARMERS' ASSOCIATION,—President: C. B Lloyd; Vice-President:—R. Garland; Hon. Treasurer: H. A. Rohde; Collector: Capt. W. H. Stevenson; Auditor: Claude Scott; Hon. Secretary: E. Cautherley.

MUDEN AGRICULTURAL ASSOCIATION.—President: Thos. Thresh. Vice-Presidents: Wm. Lilje, E. A. Grantham. Secretary and Treasurer. C. A. Selling. Committee: Otto Rottcher, Karl Lilje, Karl Rotter, Herman Schafer, Fritz Torlage, T. Braithwaite, Ernest Rottcher, C. H. Tilbrook, Rev. H. Rottcher (Hon. Life Member).

NEWCASTLE.—President: F. A. R. Johnstone. J.P. Vice-President: C. Earl, J.P., Mayor of Newcastle; Angus Wood, J.P., Ingogo; O. Schwikkard, C.M.G., Newcastle. Secretary: Wm. Beardall. Treasurer: Ed. Nicols. Executive Committee: L. H. S. Jones, E. Phillips, H. C. Caldecott, C. Watson, G. Langley. W A. Lang, W J. P. Adendorff, J. E. de Wet, O. Davis, S. W. Reynolds, B. Pettigrew, G. W. Thomas, G. H. Bishop, H. R. Muir, M C. Adendorff, W. Napier, P. Van Breda, Chriss Botha, G. Templer.

NEW HANOVER AGRICULTURAL ASSOCIATION.—President: R. H. Oellermann. Vice-Presidents: J. C. Watt, J.P., and J. A. Westbrook. Life Member: C. A. S. Yonge, M.L.A Secretary and Treasurer: W. D. Stewart, New Hanover. Auditor: J. H. F. Hohls. Committee: W. N. Angus, E. Bentley, W. W. Bentley, Edward Boast, H. W. Boast, F. E. Comins, G. R. Comins, C. Crookes, jun., G. Lemont. H. Dinklemann, J. Duval, W. Fortmann, Dr. C. H. Herbert, J. Hillermann J. H. F. Hohls, H. Jacobson, H. A. Light G. C. Mackenzie. A. F. Mackenzie, T. M. Mackenzie, J. Muirhead, J.P., G. Moe, J. Moe, O. Moe, C. Oellermann, F. Oellermann. R. H. Oellermann, J. C. Otto, H. Oellermann, E. Peckham, J.P., J. A. Potterill, S. Peckham, C M. Scott, Rev. J. Scott, Wm. Schroder, J.P., Owen Solomon, J. H. Smith, Riby Smith, H. Thöle, F. Thöle, H. Vorwerk, H. F. Westbrook, W. H. Westbrook, C. Westbrook, T. Wolhuter.

NOODSBERG ROAD AGRICULTURAL ASSOCIATION.—President: Fritz Reiche, J.P.; Vice-Presidents: H. Mummbrauer, P. Rodehorst, W. Dralle, W. Wortmann; Committee: W. Bartels, F. Bosse, H. Brammer, A. J. Bruyns, H. Bruyns, Carl Dralle, H. Gebers. W. Gevers, J. H. Holley, jr., W. C. Holley, C. Hillermann, L Koch, H. Köhler, F. E. Kuhn, M. Maister, H. Mereis, A. Meyer, H. Meyer-Estorf, H. W. Meyer, K. A. Meyer, H. Misselhorn, W. Misselhorn, K Peters, I. Pfotenhauer, G. Rabe, G. Reiche, Joh. Reiche, W. Rencken, H. Rosenbrock, H. Schmidt, K. Schmidt, Rev. Jas. Scott, K. Seele F. J. Smith, J. Thies, W. Witthöft, P. Worthmann, A. Wortmann, F. Wortmann, H. Wortmann; Secretary: Paul Vietzen, P.O., Singletree; Hon. Treasurer: E. Beurlen, NOTTINGHAM ROAD FARMERS' ASSOCIATION.—President: W. Henwood, J.P. Vice-President: J. King, J.P. Auditor: A. Mengens. Secretary and Treasurer: C. J. King, Nottingham Road.

PIETERMARITZBURGSCHE BOEREN VEREENIGING. — President: D. P. Boshoff; Secretary: E. G. Jansen, 313, Loop Street, Maritzburg.

RICHMOND AGRICULTURAL SOCIETY — President: John Marwick. Vice-Presidents: W. P. Payn, A. W. Cooper, J. W. McKenzie and Chas. Nicholson. Honorary Treasurer: R. Nicholson. Hon. Secretary: Tom M'Crystal. Committee: J. W. T. Marwick, Evan Harries, R. A. McKenzie, F. O. Howes, H. M. Moyes, W. Comrie, Thos. Marwick, J. C. Nicholson, J. W. Flett and E. J. B. Hosking.

ROYAL AGRICULTURAL SOCIETY OF NATAL.—President: Sir G. M. Sutton, K.C.M.G. Vice-Presidents: His Worship the Mayor, Messrs. Jas. King, O. Hosking, D. C. Dick, Col. E. M. Greene and P. D. Simmons. Executive: Sir G. M. Sutton, President; Messrs. Jas. King, O. Hosking, D. C. Dick, Col. E. M. Greene and P. D. Simmons, Vice-Presidents; Committee: G. J. Macfarlane, W. S. Craft, W. H. Cobley, H. J. Stirton, W. J. O'Brien, L. Line and Sir T. K. Murray. Yard Superintendent: H. J. Stirton. Secretaries, Treasurers and Collectors: Duff, Eadie & Co., 12, Timber Street, Pietermaritzburg. Auditor: G. V. Lambert.

SLANG RIVER (UTRECHT) FARMERS' ASSOCIATION.—Chairman: P. J. Kemp; Executive Committee: J. J. Uys, J. Z. Moolman, T. J. Botha, P. J. Viljoen, P. J. Kemp; Hon. Sec. and Treasurer, Thys Uys, Utrecht P.O.

UMVOTI AGRICULTURAL SOCIETY.—President: Major T. Menne. Vice-Presidents: Theunis J. Nel, M.L.A., W. J. Slatter, W. L'Estrange. Executive Committee: Tol Nel, A. Newmarch, W. Lilje, O. Rottcher, S. C. Van Rooyen, W. Newmarch, E. J. Van Rooyen, O. Norton, I. M. Nel, J. Browning. Managers of Show Yard: J. M. Handley and N. Hunter. Hon. Auditor: W. K. Ente. Secretary and Treasurer: W. H. Gibbs.

UPPER BIGGARSBERG FARMERS' ASSOCIATION.—President: George Langley; Vice-President: W. L. Oldacre; Secretary: J. H. Murray.

UTRECHT AGRICULTURAL SOCIETY.—Chairman: L. Viljoen; Vice-Chairman: B. H. Breytenbach; Members: I. Bierman, M. M. Knight, J. H. Klopper, B. C. Hattingh, T. Botha, M. Gregory, P. L. Uys, H. P. Breytenbach; Secretary: G. J. Shawe.

UTRECHT BOEREN VEREENIGING.—President: D. J. A. van der Spuy; Secretary: G. J. Shawe, Utrecht.

VICTORIA COUNTY AGRICULTURAL SOCIETY.—President: Lieut.-Colonel F. Addison; Vice Presidents: Sir Liege Hulett, Kt., M.L.A., W. J. Thompson, Esq., J.P., J. Polkinghorne, Esq., M.L.A.; Committee: Messrs. W. H. B. Addison, G. S. Armstrong, M.L.A., C. Bishop, J.P., D. Brown, sen., J.P., W. Campbell, T. G. Colenbrander, A. E. Foss, J.P., A. S. L. Hulett, J.P., J. B. Hulett, C. Jackson, G. Nicholson, J.P., T. Polkinghorne, J. W. Perkins, J.P., E. Saunders, J.P., G. Stewart, and J. H. Stansell; Hon. Secretary and Treasurer: H. Curtis Smith (Stanger)

WEENEN AGRICULTURAL SOCIETY.—President: A. F. Henderson, Esq., C.M.G.; Vice-Presidents: J. Button, J.P., Jas. Ralfe, J.P., H. Blaker, J.P., E. B. Griffin, J.P.; Hon. Treasurer: F. C. Schiever; Auditor: S. Wolff; Executive, Hon. H. D. Winter, R. H. Ralfe, J. W. Moor, D. W. Mackay and Allan Stuart; Manager of Show Yard: S. Vaughan; Assistant: A. Clouston; Hon. Secretary: E. Cautherley.

WEENEN COUNTY HORTICULTURAL SOCIETY. — Committee of Management: A. F. Henderson, C.M.G., F. C. Schiever, G. W. Linfoot, P. J. Nunn, Dr. Brewitt, S. Vaughan; Hon. Secretary: E. Cautherley.

ZULULAND FARMERS' ASSOCIATION.—President: F. W. White; Vice-President: C. E. Symonds. Committee: J. J. van Rooyen, A. W. Symonds, H. T. James, R. J. Ortlepp, J. P. Kokemoer.

ZULULAND COAST FARMERS' ASSOCIATION. — President: G. H. Hulett; Vice-President: C. Hill; Hon. Secretary and Treasurer: F. Brammage, Ginginhlovu.

(The Editor will be obliged if the Hon. Secretaries will supply him with lists of the Executives of their Associations.)

Trees for Sale.

To encourage tree-planting, transplants and seeds of forest trees are supplied by Government, so far as in stock, at the undermentioned rates, exclusive of carriage, from the Government Nursery, Central Experimental Farm, Cedara.

Transplants of Eucalyptus, Pines, Acacias, Casuarinas, Cupressus, etc., about 25 trees in each tin, at 8s. 4d. per 100 trees. Trees in separate tins at 1s. each.

Transplants of scarce kinds, larger trees, or surplus stock, when available, will be charged at special rates, which will be furnished on application.

Tree seeds, in variety, at 1s. per packet. Price per pound, which fluctuates, wil be furnished on application.

Package and postage of seed, when required, charged 1s. per lb. extra.

Orders for present or spring delivery should be addressed to the ***Forester, Cedara,*** and must be accompanied by a remittance in cash or postal order. Cheques cannot be accepted.

T. R. SIM,
Conservator of Forests.

Employment Bureau.

THE Department of Agriculture has received applications from the undermentioned, who are prepared to become assistants or apprentices on farms. The Department will be glad to hear from farmers willing to take young men as assistants, and to place them in correspondence with the various applicants. When communicating on the subject, farmers may refer to the applicants by quoting the numbers in the following list:—

No. 91a.—Scotchman, 42, seeks management of stud. Life experience as tenant farmer in south of Scotland, breeding, rearing, breaking and showing Clydesdales, hackneys, and half-breds. Has bought horses in Ireland and taken charge of them on board ship and while on rails. References and testimonials.

No 94.— cotchman, who has lived all his life in South Africa, desires employment on farm in connection with stock if possible. Was a Head Conductor during Boer War. Was 2 years with Transvaal P.W.D. as handyman. Produces good references. Desires salary.

No. 95.—German, of respectable appearance, who speaks English fluently, desires employment on a farm. Is 48 years of age, and has been accustomed to farm work, wire fencing, masonry, carpentry, &c. Salary required.

No. 97a.—Colonial, aged 22, bricklayer by trade, speaks Zulu, Dutch, and Hindustan, desires employment as a farm hand. Was on a farm in vicinity of Pretoria for six months.

No. 98—Englishman, 25 years, desires situation on sheep and stock farm. Had experience of sheep on father's farm in Lincolnshire. Has been four years in Natal.

No. 100. Englishman, 23, with experience gained in Richmond district, desires to get on to farm further up country. States he is active and not afraid of work. Wage no particular object.

101a.—A destitute boy of 17 years of age, and at present living on charity. Said to be strong and healthy and one who should be able to make himself useful on a farm.

No. 102.—Applicant, 45 years of age, at present a factory manager in Mauritius, desires employment in Natal. Has had 25 years' experience in the cultivation of sugar cane and vanilla. Produces good testimonials. Services are likely to be available shortly owing to failure of the cane crop. Is married, with family.

103a.—30 years of age, desires employment on tea estate. Has 3 years' experience in Ceylon and understands thoroughly, he states, the cultivation and manufacture of tea. Also kept the estate books.

104a.—Yorkshireman, 36 years of age, seeks position as manager of a farm. English and Colonial experience. Was at one time manager of an experiment station. Good references. Married.

105a.—Boy, 17, English, desires employment on a farm.

106a.—Colonial, aged 24, bricklayer by trade, desires situation on a farm. Steady and reliable, with a few months' experience of farming.

107a.—About 45 years of age, who has held positions of responsibility on the N.G.R. and Rhodesian Railways, desires employment. Produces good references.

Rules for Agricultural Co-Operative Societies.

THE Department of Agriculture has for disposal, at the rate of one shilling each, copies of Model Rules for the use of Agricultural Co-operative Societies. Applications should be made to the Secretary, Minister of Agriculture, Pietermaritzburg.

Bulletins Issued by the Dept. of Agriculture.

Single copies may be obtained free (excepting those with price attached) no application to the Secretary, Minister of Agriculture.

No.
1.—"Notes on Fruit Culture," by Claude Fuller. [1902]. *(Out of print).*
2.—"Manures on the Natal Market, 1902," by A Pardy. [1902].
3.—"Insects in an Important Rôle," by Claude Fuller. [1904]. *(Out of Print).*
4.—"Manures on the Natal Market, 1903," by A. Pardy. [1903].
5.—"Weed Circular," by Claude Fuller. [1905].
6.—"Manures on the Natal Market, 1904," by A. Pardy. [1904].
7.—"Tree-planting in Natal," by T. R. Sim. [1905]. *(Price 2s. 6d.)*
8.—"Agricultural Co-operation," by E. T. Mullens. [1905]. *(Out of Print)*
9.—"Potato Culture" by A. N. Pearson. [1905].
10.—"Manures on Natal Market, 1905," by A. Pardy. [1905].
"Agricultural Statistics, Natal, 1904-5." [1906].
11.—"East Coast Fever," by S. B. Woollatt. [1906].
12.—"Manures on Natal Market, 1906," by A. Pardy. [1906].

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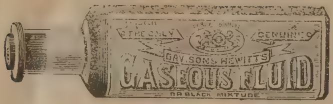
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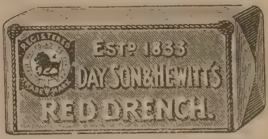
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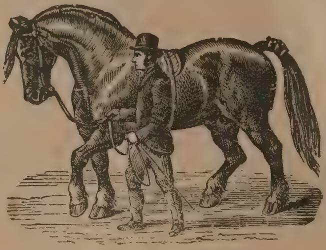

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TO LENNON LIMITED, Durban. THE BRICK YARDS, UMGENI, DURBAN, NATAL, *September 26th, 1900.*

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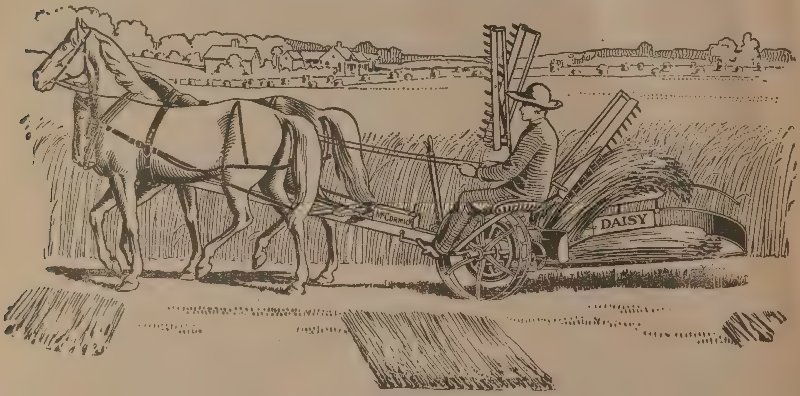

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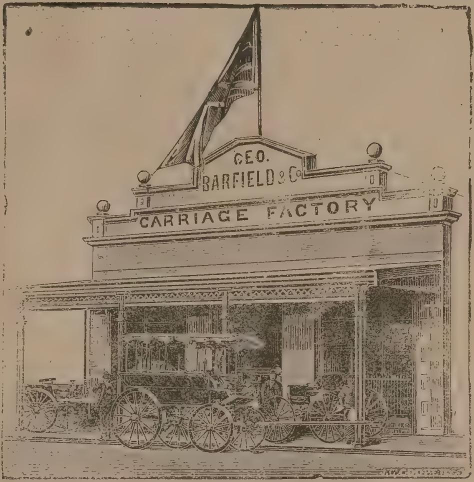

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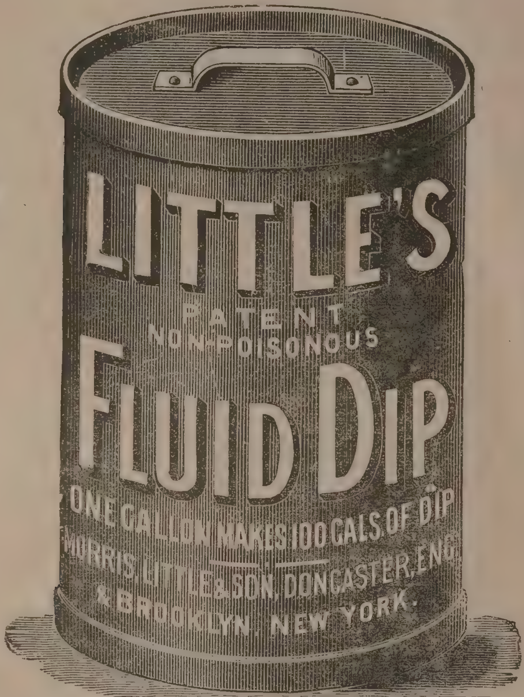
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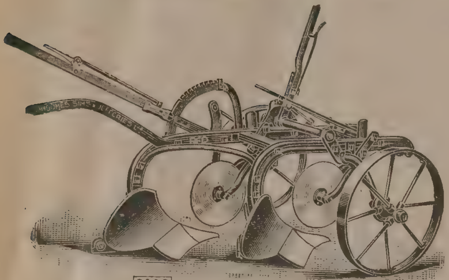

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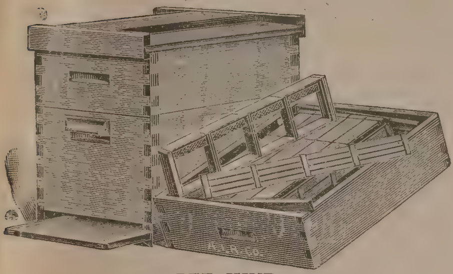

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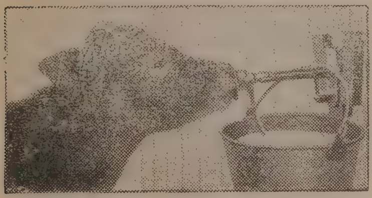

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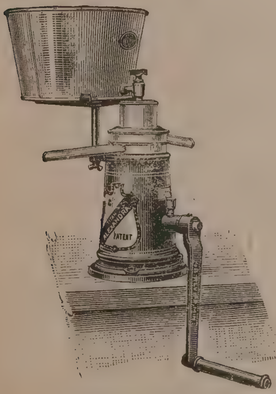

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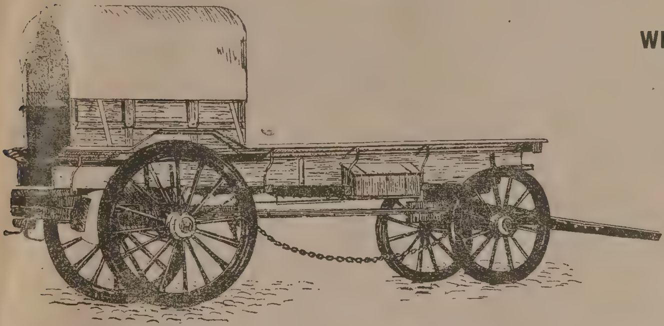

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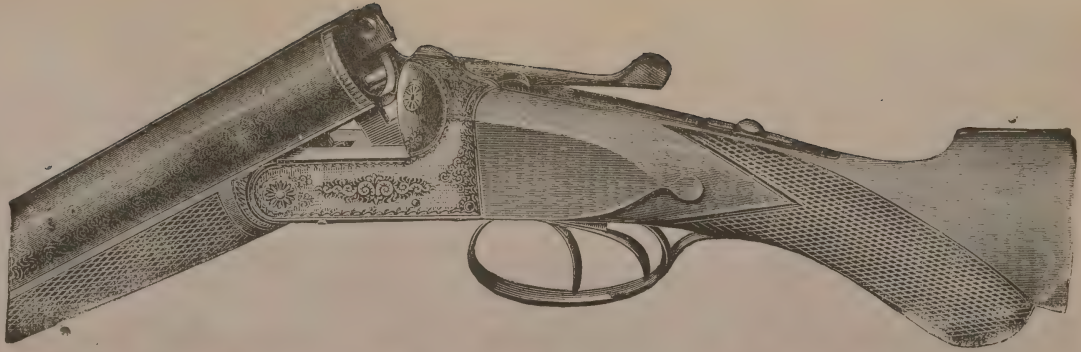

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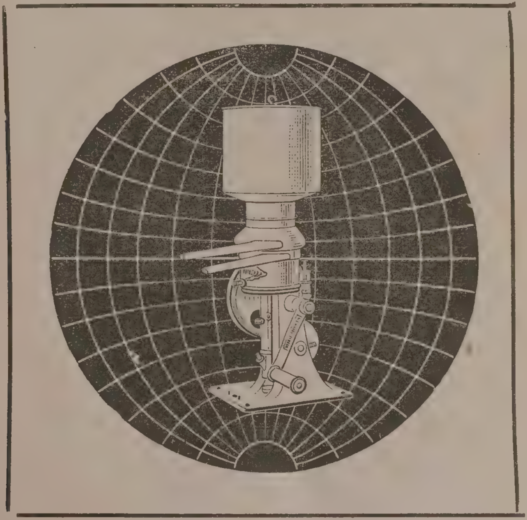

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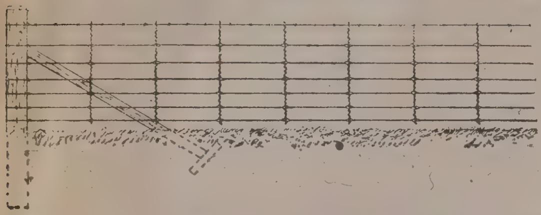

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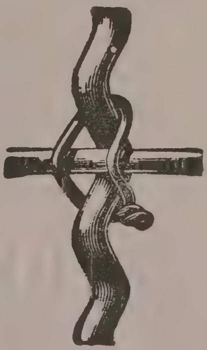

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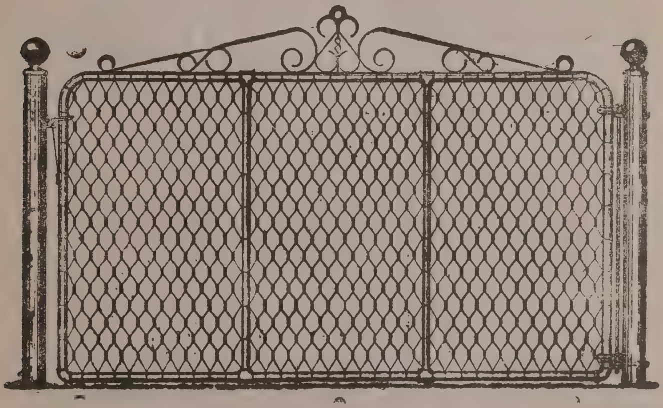

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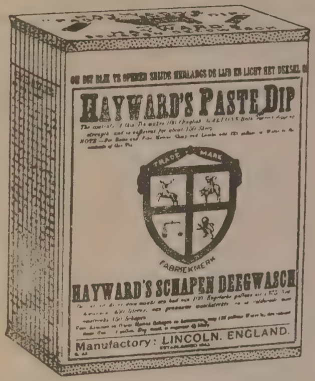
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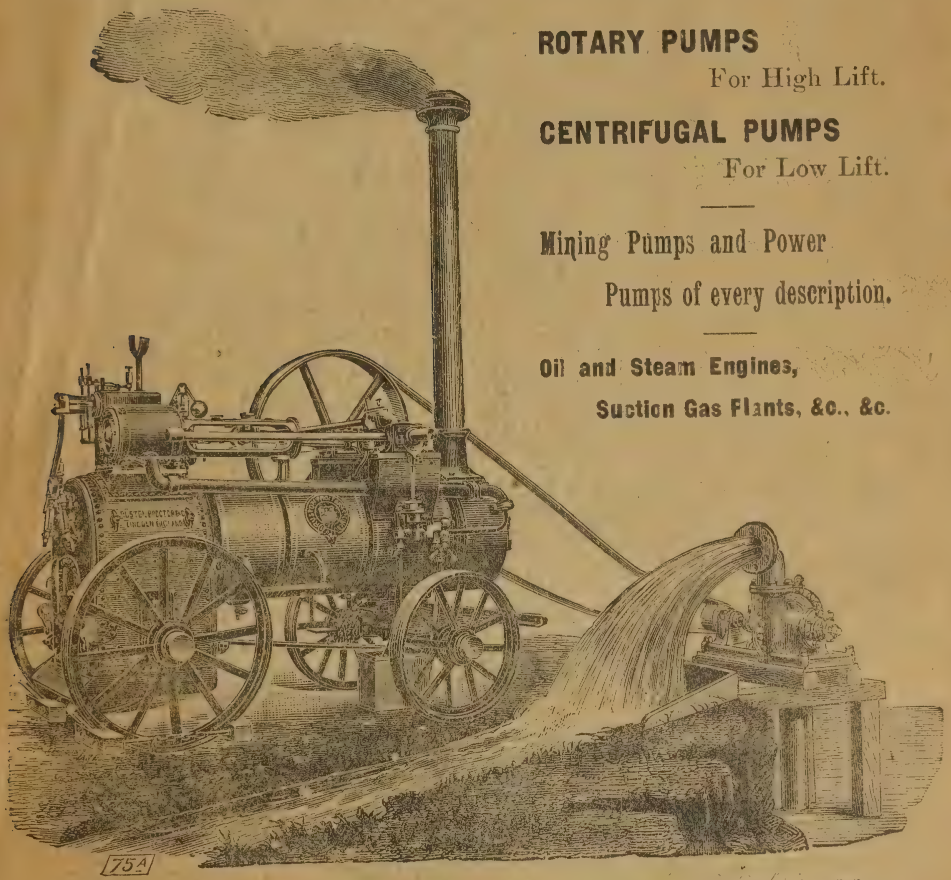

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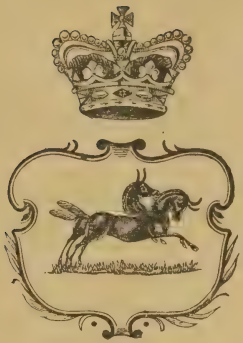
Vol. X., No. 10. *OCTOBER 25, 1907.*



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NATAL AGRICULTURAL JOURNAL

AND

MINING RECORD.

Published for and Edited in the Department of Agriculture.

Publishers:
THE "TIMES" PRINTING AND PUBLISHING COMPANY, LIMITED.

1907.

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Our Illustrations.

Owing to failure on the part of the firm entrusted with the preparation of the process blocks for the *Journal* to supply this month's blocks up to the time of going to press, we are regrettably compelled to allow the *Journal* to appear this month without the usual illustrations.

The blocks which were to have appeared in this issue will appear in next month's *Journal,* in addition to the usual number.

Vol. X, No. 10. OCTOBER 25, 1907.

Natal Agricultural Journal and Mining Record.

The Ham and Bacon Industry

We commend to the attention of our readers the following interesting paragraph taken from the *B. and S.A. Export Gazette,* apropos of the project to start a ham and bacon factory in the Camperdown district:—

> Though much has been heard of late years concerning the feasibility of establishing bacon curing factories in various parts of South Africa, very little of a practical nature has been done, and in this branch at any rate the import trade remains unchallenged. During last year the Cape Colony alone imported bacon and hams to a value of nearly £100,000, and the trade with the whole of South Africa reached a sum of no less than £203,194, of which the United Kingdom supplied 81 per cent. Even more striking are the figures for the present year, and it is evident that an important development of this department of the provision business is in progress, for during the January-June period the value of the imports rose to £164,844, as compared with £143,399 in 1906. These figures, which are drawn from official sources and are therefore unimpeachable, give the lie direct to the pessimistic reports which have gained currency, and completely verify the statements on the subject which we have published from time to time. They, in fact, fully demonstrate the expanding value of the South African demand for bacon and hams, and should do much to encourage the enterprise of Home shippers in what is, beyond a shadow of doubt, their largest market in the world. Of the menace of local competition little need be said. The efforts to found a Colonial industry are of a spasmodic and ineffectual character, being rendered so by the initial fact that no effort is made to raise the breeding and management of pigs to an adequate standard in South Africa, and it is safe to say that many years must elapse before Colonial bacon and hams can be placed on the market in sufficient quantity and quality to make their competition a thing to be reckoned with in the slightest degree.

Note, in particular, that the figures quoted "fully demonstrate the expanding value of the South African demand for bacon and hams," and that South Africa is looked upon as being, "beyond a shadow of doubt," the "largest market in the world" for English shippers.

This may prove very interesting reading for English producers and shippers; but let the reader pause and consider what these undeniable facts imply so far as we in South Africa are concerned. They mean that South Africa is exporting wealth at the rate of over £200,000 per annum for the purchase of bacons and hams alone from overseas, when those bacons and hams, every pound of them, could be produced in our own country. Natal in 1906 consumed 549,178 lbs. of imported bacon and hams, valued at £18,324. That is to say, we are draining the country of wealth at the rate of some £18,000 per annum to supply our requirements in the line of bacon and hams alone. This is one of the many leaks that are partly responsible for the present depression, and it is one of no mean proportions. It is, further, one for which there can be no just excuse offered.

The argument that there is little or no local demand for *Natal* bacon and ham is no excuse for the neglect of an industry in which there are possibilities in this Colony equal to those of any other country. What must be considered in a case where a prejudice exists against locally produced stuff, is the question of nullifying the evil effects consequent upon the demand for overseas goods. This may be effected in the particular case which we are considering by the organisation of an export trade with the other South African Colonies. Here is a market to the extent of over £180,000. Were we to halve this amount—make it £90,000—or even quarter it and say that our possibilities in the direction of the export of bacon and hams are to the extent of £45,000, our own imported bacon and hams would be paid for and a large surplus would be placed to the country's credit, in addition.

To supply the whole of South Africa with all her requirements in so far as bacon and hams are concerned is an ideal that, we fear, must ever remain an ideal; but there is every reason why our farmers should bestir themselves and rapidly build up a flourishing export business with the other Colonies, and in a few years be supplying, say, quite half of the requirements of the rest of South Africa.

A start has been made in the Camperdown district in the direction of establishing a ham and bacon factory, on lines that contain greater promise of success than any similar project that has hitherto been undertaken in this country. There are three primary essentials that must be considered and accepted as such before success in any considerable degree can be realised. These are: (*a*) due attention to breeding, feeding, and management of the pigs; (*b*) regularity of supply of pigs to the factory; and (*c*) the adoption of co-operative principles.

Export of Mealies.

Most gratifying are the results of the effort that is being made to establish an export trade in grain with Great Britain.

Once more we see the truth of the principle that adversity brings strength—in national as in individual life. Our commercial depression—one day we shall have cause to bless this much-maligned depression of ours!—has made us look to our own resources; and here we are with every prospect of some £200,000 or more coming into the country within the next two or three months as payment for the sale overseas of the half-a-million muids of mealies that we expect to export this season—and this season, moreover, we expected to do more than *experiment!*

The future lies with our farmers. What we are capable of doing now is evident. Our mealies are pronounced excellent, and they are realising good prices in Europe: a well-informed Durban correspondent tells us that 27s. 3d. per quarter has been paid in London for our grain this month, and in a cable to the Minister of Agriculture on the 16th October, the Agent-General stated that he had been informed that it is "extremely probable that the market will remain at 27s. to 28s. per quarter landed at wharf until the end of November." Freights are low enough; and the presence of a Government-appointed inspector at the Port ensures adherence to standard. What more do we want? The next step is to extend the cultivation of our staple crop: there is plenty of land lying fallow on private farms all over the country which can be cultivated and a bumper crop be ensured next season. We have nothing to fear as regards the market. In the old days, to extend the cultivation of a crop beyond a certain limit spelt loss: to a certain degree, the smaller the crop was, the greater was the gain. Now, however, with the limitless market that lies before us, we can safely put more and more land under mealies; and the extent of our income from this grain will only be bounded by our ability to produce.

The following from the *Natal Mercury* comes as a refreshing breeze over the parched veld in these times of depression, and gives a good idea of what is being done: "Mealies are being sent to the port from up-country faster, almost, than accommodation can be found for them, and at the present rate the shed space available at the Point will be presently exceeded. Bags of yellow and white grain lie stacked in tens of thousands in Sheds C, D, E, and F, five and six deep, and covering every foot of the floor area, except the space that is kept clear for narrow alleyways between the ramparts of grain-bags. Rows of railway trucks, loaded with mealies, are constantly passing in and out of each shed, discharging fresh consignments of grain for the great oversea market which Natal has just freshly discovered, and the Government inspector, Mr. Westbrook, is being kept employed each day, from half-past seven in the morning to half-past five in the afternoon, in doing nothing else but testing the grain in the bags, grading it according to quality, and certifying it to be fit for exportation as first-class Natal produce."

Notes and Comments.

OUR LATE APPEARANCE.—In spite of special efforts which have been made to bring the *Journal* out to time, delay in publishing has this month been inevitable owing to changes in the offices of the Department which took place at the time we should have been going to press.

INTRODUCTION OF SWINE FROM CAPE COLONY.—Proclamation No. 84, 1904, by which the importation of swine from Cape Colony was prohibited, was revoked by Proclamation in the *Government Gazette* of the 24th September.

MARKET FOR DRIED LOCUSTS.—Quotations are being called for by the Department of Agriculture, Capetown, for the supply of dried locusts in bags of not less than 75 lbs. nett, delivered f.o.r. at the nearest railway station. The locusts must be thoroughly dried before being bagged, and the bags guaranteed free from earth or stones.

DESTRUCTION OF JACKALS.—In consequence of the depredations of jackals amongst sheep and other stock as well as game, in various parts of the country, the Government has decided to offer a reward of ten shillings a head for their destruction. There are several kinds of jackals in the Colony, but it is only in respect of the most destructive variety—the Red or Black-backed or Silver Jackal, known by the natives as *Impungutsha* or *Ikanka*—that the reward is offered. For the young of the same kind of jackal, under three months old, half-a-crown per head will be paid. The reward may be obtained upon production of the entire skin—which must be fresh—at the nearest Magistracy. Applications for permission to hunt jackals on Crown Lands and Locations must be made to the Department of Agriculture, Pietermaritzburg.

RETURNED FRUIT AND VEGETABLE "EMPTIES."—From the 1st November empty packages which have been used for the conveyance of South African fruit and vegetables by rail between N.G.R. Stations will, when consigned as Returned South African Fruit Empties to the original consignor, be conveyed at the following rates: Up to 50 miles, 2d. per package; 51 miles and over, 3d. per package. These rates are station to station at owner's risk. These charges will not apply to returned South African egg, butter, and other boxes, which will be conveyed free at owner's risk, as at present.

S.A. PINES IN LONDON.—In a recent report to his Government on the Cape fruit trade, Mr. Chiappini, the Cape Trades Commissioner in London, says, with reference to pines: "I have had several trial shipments of these fruits sent to me for disposal, and there is a certain market for a very large trade being done in them. A good orange-coloured fruit of as large size as possible is required, and no fruit should be packed that is damaged or blemished in the slightest degree. Only one size should be packed in each box, and single-layer boxes to contain 10 or 12 fruits each, packed as tightly as possible, should be uniformly adopted. If the export is commenced as early as possible in the season and gradually increased, I am sure a market could be found for 10,000 dozens a week. The total cost for freight, railage, and sale charges should not exceed 2½d. each fruit, and the wholesale price for good-sized fruit of attractive appearance and flavour should be 5d. or 6d. each."

INTRODUCTION OF CATTLE FROM CAPE COLONY.—In consequence of the prevalence of lungsickness in Cape Colony, the introduction of all cattle from that Colony into Natal has been prohibited. This prohibition, however, does not apply to Alfred County: cattle will be allowed to be introduced into Alfred County from Cape Colony provided that they are accompanied by a certificate from a Magistrate or a Stock Inspector that they are free from infection, and that there has been no lungsickness on the farm from which they come for a period of three months. Cattle intended for slaughter purposes may, however, be imported into Natal from Cape Colony, provided that they are accompanied by a certificate from a Magistrate or a Stock Inspector stating that they are free from infection, and that there has been no lungsickness on the farm from which they come for a period of three months, and provided further that they travel direct from the border to Creighton Station under supervision, and that they are trucked direct to approved slaughter houses for immediate slaughter. Permission to introduce such slaughter cattle must first be obtained in writing from the Principal Veterinary Surgeon, Pietermaritzburg, who may impose any further conditions which he may deem necessary.

NATAL RUBBER FOR ENGLAND.—Early in October the "Armadale Castle" took the first large shipment of rubber from Natal to England, a consignment of half a ton, which it is hoped will be followed by regular shipments. The rubber, which is declared by experts to be of first-rate quality, is from wild *Landolphia* vines in Amatongaland; and has been extracted under the supervision of Messrs. Lepper & Pennington, who two years ago obtained the lease of 600 square miles from Government for the purposes of rubber cultivation and extraction.

S.A. CONDENSED MILK.—Readers of the *Journal* interested in the progress of the condensed milk factory at Port Elizabeth, referred to in our May issue, will be glad to learn that this factory is unable to meet the demand which has already risen for its wares. According to the *South African Trade Journal,* experts speak most favourably of this product, which is said to be more than equal to the imported article. The same journal learns that it is not improbable that the site of the factory may be moved to a quarter where larger supplies of milk will be available, so as to reduce working expenses. A well-known firm of jam manufacturers in the Western Provinces of Cape Colony have also, it is stated, undertaken the manufacture of condensed milk, and have laid down a large plant specially imported from Europe.

ENTRY OF CATTLE INTO TRANSVAAL FROM NATAL.—The following regulations, framed under the provisions of the Transvaal Ordinance No. 17 of 1902, have been approved by His Excellency the Governor of the Transvaal:—1. No person shall import any cattle from the Colony of Natal, except cattle having been imported for breeding purposes from oversea and having passed through Natal by rail direct have entered this Colony under special permit and subject to such conditions as the Minister of Agriculture may prescribe; and any person contravening this Regulation shall be liable on conviction to a fine not exceeding fifty pounds and in default of payment to imprisonment with or without hard labour for a period not exceeding six months. 2. Any cattle which may after the date of the promulgation of these Regulations have come into this Colony from the Colony of Natal save such cattle as are expressly excepted from the prohibition contained in the preceding Regulation, and save such slaughter stock for which permits have at the date of such promulgation been issued, may be seized by any Resident Magistrate, Native Commissioner, Sub-Commissioner, Justice of the Peace, Police Officer or Constable, and detained and taken to a place of isolation, and the person so seizing and detaining such cattle shall immediately report all the circumstances to the Minister of Agriculture who may order any such cattle to be slaughtered or otherwise dealt with.

CO-OPERATIVE DAIRYING IN FINLAND.—The first co-operative butter export association in Finland (called the Valio) was founded in 1905. H.B.M. Consul at Helsingfors says, in a recent report, that, to begin with, this association had only 17 dairies belonging to it, but that by the end of the year the number had increased to 44. In January, 1906, about 300 casks of butter were exported per week. The maximum was reached in the summer of that year, when more than 2,000 casks per week were exported. The number of dairies belonging to the association has now increased to 70, and the total quantity of butter exported amounts to about 60,000 casks, valued at about £320,000.

EXPORT OF ANGORA GOATS FROM BASUTOLAND.—The following Government Notice appeared in the *Natal Government Gazette* of the 24th September: "It is hereby notified, for general information, that a proclamation is being issued by His Excellency the High Commissioner, imposing from and after the 1st October next, a duty of £100 upon the export of every Angora ram or ewe from Basutoland save and except to colonies and territories having similar legislation. The proclamation also imposes penalties upon any person who shall export from Basutoland any Angora ram or ewe in contravention of its terms. As Basutoland, by this proclamation, comes under the provisions of Act No. 12, 1901, Angora rams and ewes may, after the 1st October next, be taken to and from Basutoland without the payment of any duty.

THE PIPE-CALABASH.—The pipe-calabash industry in Cape Colony is assuming appreciable proportions; and in view of a possibility of the culture of this calabash on an extended scale in Natal, the following note upon its cultivation, supplied to the U.S. Consul-General at Capetown by the Department of Agriculture of Cape Colony will doubtless be of interest to readers:—A medium light loam, or even a sandy soil, is best for the successful growing of the pipe calabash. The growing season will vary with localities from four to five months; the condition under which it grows may be best described as semi-tropical, and it is usually found alongside tobacco, sweet potatoes and the like. It is characteristically a creeper, but occasionally rises into hedges or shrubs, growing as a climber. It requires abundant sunshine, and a warm soil and aspect. It is usually found in vegetable gardens, or on similar fertile, or at least well-manured, spots. Stable manure is commonly used. The stalks of the gourd shrivel when ripening takes place; the gourds are then collected and left on the bare ground in the sun till quite yellow and hard. In polishing and making into pipes, the aim seems to be to avoid breaking through the skin. In some places upright stakes are put round the gourds so as to assist the natural bend of the stem, but elsewhere this is left to nature.

SORE EYES AND HEAD IN POULTRY.—A correspondent of the *Natal Mercury* gives particulars (in the "Poultry Notes" column) of a simple treatment for sore eyes and head in fowls, which he has found successful in the case of a number of fowls of his own that were suffering from the ailment. The first thing, he says, is to isolate the birds, to prevent the disease spreading, then bathe with the following: To half a cup of black tea put a quarter of a teaspoonful of alum and bathe the head and eyes well. If it is vermin the writer states he always uses Keating's Powder freely in all coops and boxes, and on the birds as well. This keeps them free from all fleas—the small sand variety that obtains such a tight hold and causes the birds so much trouble.

FIBRE IN PORTUGUESE EAST AFRICA.—According to a report by H.B.M. Consul-General at Lourenco Marques (Major J. G. Baldwin), recently published by the Foreign Office, attention has been directed within the last year or two to the cultivation of fibre plants in Portuguese East Africa, and a considerable plantation of Sisal hemp has been started in the Inhambane district. It is stated to be immune from the attacks of white ants or other insects and to flourish in the dry sandy soil which is found near the coast. Experiments have been made with the same plant near Lourenco Marques, and some of the fibre produced has been found to be excellent, both in length and quality. Other varieties of *Agave* would no doubt, it is stated, do equally well, and there seem to be possibilities in their cultivation.

MANURING TOMATOES.— In a discussion at the Vegetable Growers' Association of Canada recently, the question of the best system of manuring the tomato crop was debated. The land, it was said, should not be too rich, but it is not so often a question of over-richness as that of less manuring. Fresh farmyard manure, applied to the land the same spring just before planting, was followed by an excessively wet season, and an excessive growth of vine was had at the expense of early maturity. A piece of heavier poor land that for years had never had any manure, the same wet season produced a profitable crop of tomatoes, while it had never done so in a dry season. An excessive use of nitrate of soda has produced vines at the expense of early maturity on sandy loam in good heart, while the heavier clay land has responded to the use of nitrate of soda in an increased crop. For the average season, sandy loam well manured with farmyard manure for a previous crop, then ploughed and worked in the spring and manured with a good superphosphate (14 per cent.) at the rate of 600 to 800 ℔s. to the acre, and muriate or sulphate of potash 300 ℔s. to the acre, is said to give good results. If the plants are slow in starting, giving enough nitrate of soda to start them, but not to prolong the growth, will prove beneficial.

COTTON IN CAPE COLONY.—We learn from the Bloemfontein *Post* that an effort is being made to encourage cotton-growing in the Cape Colony coast districts. A large quantity of the finest Egyptian cotton seed is being distributed among farmers who will undertake to prepare the ground in a suitable manner for planting. There are stated to be thousands of acres in this and other districts of the Colony lying between the Fish River, Buffalo, Nahoon, Great Kei, Bashee and St. John's, which could be utilised for cotton-growing.

SWEDISH SUGAR TRUST.—H.B.M. Minister at Stockholm reports, says the *Board of Trade Journal,* the combination of all the principal sugar producing industries in Sweden into one great company with a capital fixed at a minimum of five and a half millions sterling and a maximum of eleven millions. Of this maximum, it appears that about eight millions are being issued at once, and that shares to that amount have already been taken up. H.M. Minister adds that the more important producing industries have, for some years past, worked on the "Cartel" system in concert, but that their actual amalgamation into one vast company with headquarters in Stockholm, which will be able to control production and price, has come as something of a surprise, absolute secrecy having been maintained during the preliminary negotiations.

ADVANTAGES OF LAND DRAINAGE.—Elsewhere in this issue will be found a note upon the relation between irrigation and drainage as exemplified by the experience in the Yakima Valley, Washington, U.S.A. This should prove of particular interest to blockholders on the Weenen and Winterton Irrigation Settlements, and should, in fact, be found of value by all who are interested in irrigation matters. Draining is one of the first operations that have to be performed in bringing a soil into the condition best calculated to enable it to produce fine crops. The principle of drainage is not to get all the water out of the land, but only to carry away the surplus, and prevent water from becoming stagnant. When a soil becomes water-logged, fresh supplies of rain, with their gases in solution (carbonic acid gas, ammonia, and nitric acid, for example), cannot pass into the soil. On account of this and the fact that the stagnant water contains no plant food, a great loss occurs to the soil. Moreover, an undrained field is found to be much colder than one that is drained; and, again, air finds great difficulty in getting into undrained land, but when water passes through a soil, air must follow, or else there would be a vacuum. An improvement of temperature and mechanical condition of the soil; an earlier harvest, caused by the land being warmer; larger crops, on account of the deeper penetration of the roots into the soil and the consequent greater availability of plant-food; and a larger percentage in the germination of seeds, may be mentioned as a few of the advantages which must follow an intelligent soil-drainage system. In addition, tillage is rendered easier and less expensive, for dry land is always easier to work than wet land, and there will be more opportunities of working it. Heavy clay land, in particular, may be mentioned as this class of land is rendered by drainage open and friable.

CO-OPERATIVE HORSE-INSURANCE.—The insurance of live stock is one of the many directions in which the value of co-operative principles of management is felt; and it is a question which is deserving of consideration in this country. On the Continent of Europe associations exist for the mutual insurance of all kinds of live stock on co-operative lines; and these associations are to be found organised in federations, thus gaining in financial strength, should an epidemic of disease occur in one locality. In Great Britain the insurance of live stock has been in existence as an adopted principle for many years, but not much has been done up to the present time to apply co-operative principles in any systematic manner. There are in existence certain commercial companies which have been established for the purpose of enabling owners of stock to insure their property, but these are in no sense co-operative, and the premiums do not encourage great advantage being taken of their existence by smaller farmers. Evidence, however, that mutual insurance of one—and that not the least valuable—description of live stock can be successfully undertaken on a small scale, is furnished by the Ninth Annual Report of the Newark Horse-Keepers' Insurance Company, Ltd., which is discussed by a writer in the August number of the *Journal* of the British Board of Agriculture. The objects of this undertaking are described to be: (*a*) to provide veterinary attendance in all cases of illness to animals insured with the company within a radius of eight miles; and (*b*) to pay to the insurers two-thirds of the market value of the animals insured in case of death by accident or by natural causes. The rates charged range as follows according to a definite scale: 2s. 2d. per quarter, for one animal valued at £7 10s, £5 payable at death; 5s. 9d. for one valued at £20, £13 6s. 8d. payable at death; 17s. 6d. for one valued at £60, £40 payable at death. For animals of greater value than £60 a special rate is quoted. These premiums entitle the insurer to free veterinary attendance and medicine should such be required during the period covered, and members are further entitled to the services and advice of the company's veterinary surgeon at a reduced fee of 5s. when purchasing a horse. The number of members now stands at 121; the market value of the horses insured is £3,505, the claimable value being £2,336 15s. 4d. The Newark Horse-Keepers' Insurance Company, Ltd., is an example of what can be done locally on small capital with capable control and management, Poisoning Rats.—There is, perhaps, no animal like the rat for vitality, prolificacy, persistency and cunning. It is a deadly pest to the young of all animals. Chickens and ducklings are never safe from it; it will eat young pigs and even attack young lambs. Grain-growing countries find it their worst pest. It destroys grain when newly planted, in the car, when stored, when shipped, in a ship's hold, on the wharf, at the railway sheds. Rats are hard to trap, and are suspicious of poisoned baits. The *Journal* of the Jamaica Agricultural Society, however, makes some recommendations which will doubtless be found useful. It recommends, as "the only safe way of laying poison," the use of a double bamboo joint —that is, with the joint in the middle open at both ends. A bait is placed in each end, and thus dogs, cats or poultry cannot get at the poison. A different kind of bait should be used every week. Roasted salt fish, end of bacon, and toasted rind of cheese form the best baits, but ripe bananas and a crust of bread often do as well. The *Journal* in question recommends barium carbonate, or barytes, as one of the cheapest and most effective poisons for rats and mice. This mineral has the advantage of being without taste or smell, and, in the small quantities used in poisoning rats and mice, is harmless to larger animals. Its action on rodents is slow but reasonably sure, and has the further advantage that the animal, before dying, if exit be possible, usually leaves the premises in search of water. Its employment in houses, therefore, is rarely followed by the annoying odour which attends the use of the more virulent poisons. The poison may be fed in the form of a dough made of one-fifth barytes and four-fifths meal, but a more convenient bait is ordinary oatmeal, with one-eighth of its bulk of barytes, mixed with water in a stiff dough; or the barytes may be spread upon bread and butter or moistened toast. The prepared bait should be placed in rat runs, a small quantity at a time. Elsewhere strychnine may be employed with great success. Dry strychnine crystals may be inserted in small pieces of raw meat, Vienna sausage or toasted cheese, and these placed in the rat runs, or oatmeal may be wetted with a strychnine syrup, and small quantities laid out in the same way.

Pure *versus* Cross-Bred Fowls.—There are few questions of greater interest to the utility poultry-keeper than that as to whether pure or cross-bred fowls are the more profitable, and, as a correspondent of the *Agricultural Gazette,* London, points out, there is much to be said on both sides. To the fancier, of course, only pure-bred fowls possess any value, but as he tends to breed his fowls to a different standard from that of the utility man, exhibition strains may be left out of account. There remains, then, the choice between pure-bred fowls of utility strains and cross-bred birds. By "cross-bred" is meant the offspring from two pure breeds, birds of more mixed blood than this being "mongrels." The advantages of using pure-bred fowls are: Firstly, the breeder knows more or less exactly what the progeny of his fowls will be like, as the purer the breed the more closely do the offspring resemble their parents. Secondly, pure-bred fowls always possess greater selling value, and if, as usually happens, there are some surplus cockerels for sale, a better price can be realised for them than if they were cross-bred, when they would only be fit for the table. Thirdly, there is always the chance that a particularly fine specimen may be bred fit for exhibition or the breeding of first-class stock, and this may mean a welcome windfall to the owner. Fourthly, the time taken by the pullets to reach maturity and come into profit can be more exactly calculated in the case of known broods, and hatching can be carried out accordingly. Lastly, where the sale of eggs, day-old chicks, or stock birds is the main business, it is undoubtedly more profitable to keep pure-bred breeding stock, as these cost no more to house and feed, and their offspring fetch much greater prices. Against these advantages it is urged on behalf of the cross-bred fowls that, firstly, they are hardier; and, secondly, being more vigorous, the pullets and hens are more prolific; thirdly, birds possessing the good qualities of both the parent breeds can to a large extent be produced (as in the case of Leghorn-Buff Orpingtons, Houdan-Leghorns), and that these are more useful as all-round birds to the utility breeder and ordinary farmer; fifthly, defects of an otherwise desirable breed can be minimised or done away with altogether by crossing with another suitable pure breed, as in the case of the Indian Game, which is too hard-fleshed a fowl to be a perfect table bird if used pure, but crossed with the Dorking or the Orpington gives splendid results. Again, the delicacy of the Dorking chickens makes it difficult to rear them in certain localities, but the offspring of the Dorking and the hardier variety breed are quite easily reared. It is a significant fact that the best birds at the leading dead table poultry shows are almost invariably cross-bred. The advantages of cross-breeding are still more marked in the case of ducks. It is well known what difficulty is experienced in getting a sufficient supply of eggs from pure-bred Aylesburys—the premier table breed—early in the season, but if the Pekin ducks are employed with the Aylesbury drake this difficulty is largely overcome. Here the superior egg-producing powers of the Pekin, crossed with the fine table properties of the Aylesbury, give a splendid result, when neither breed, used pure, would be quite satisfactory, the one as being a poor winter layer, the other as too yellow-fleshed, and not good enough in breast development for a first-class market duck. It is often urged against the keeping of cross-bred fowls that two separate breeding pens must be maintained to produce them, but this is not the case. Suppose, for instance, that the Leghorn-Buff Orpington cross is desired. The first year Orpington hens are run with a Leghorn cock. The resulting cockerels are marketed, and the pullets, which are half Orpington, half Leghorn, are mated next season with an Orpington cock.

The cockerels are again disposed of; the pullets, which are now roughly three-quarter Orpington, one-quarter Leghorn, are mated with a Leghorn cock, their offspring being once more about half-bred; and so on. It may be said that for the specialist in eggs for hatching, day-old chicks, and the rearing of stock for sale, pure breeds will pay best, as the prices to be obtained will be higher, the cost of maintenance being, of course, the same. On the other hand, the poultry-man who rears for the market will probably chiefly depend on cross-breeds; but the ordinary utility poultry farmer, who combines several branches, without specialising particularly in any one, will generally make use of both cross-bred and pure varieties of good utility strains.

Winter Feeding of Dairy Cows.

By E. R. Sawer, Director, Experiment Stations.

II.

RELATIVE VALUES OF DIFFERENT CLASSES OF ROUGHAGE.

In the August issue a record was entered of the relative results secured from a number of concentrates fed to dairy cows in conjunction with a uniform roughage ration. It was seen that oil-cakes of local manufacture mixed with mealie-meal or other starchy food could be very profitably employed as an element in any milking food. The next step in our enquiry has been to determine the respective merits of such classes of roughage as are commonly available to dairy farmers in Natal, with a view to the establishment of a complete ration promising the greatest margin of profit upon cost of production or purchase. During the whole period of experiment the cows employed were furnished with a uniform concentrate ration of 4 ℔. mealie meal and 2 ℔. cokernut cake, representing the most economic combination shown by the earlier experiment. During a preliminary period of 14 days all cows were also supplied with a uniform roughage ration of 20 ℔. maize silage and 10 ℔. maize stover, to which was added a weak solution of treacle. At the end of this period five other roughage rations were introduced and results as tabulated below secured. It was noted that in several cases feeds to which the cows were unaccustomed were at first refused, though afterwards eaten with relish. The effect was eliminated from the final results by allowing a second preliminary period of seven days, during which the cows were allowed to come under the influence of the new foods.

Concentrate Ration.	Roughage Ration.	Number of Cows.	Yield of Milk during a preceding period of 14 days.	Yield of Milk during preliminary period of 7 days.	Yield of Milk during trial period of 14 days.	Average Butter-fat before trial.	Average Butter-fat at close of trial.	Gain of Milk in 14 days due to roughage fed, as compared with complete maize roughage of stover and silage.
			lbs.	lbs.	lbs.			lbs.
4lb. Mealie Meal 2lb. Cokernut Cake	20lb. Maize Silage 10lb. Maize Stover, with Treacle	2	253½	135	256	3·9	3·8	...
Ditto	5lb. Grass Hay (chaffed) 5lb. Millet Hay (chaffed) 20lb. Maize Silage	2	427	192	436½	4·8	4·9	9½
Ditto	10lb. Grass Hay (chaffed) 20lb. Roots (sliced)	2	486	226½	497¼	3·6	3·9	11¼
Ditto	10lb. Grass Hay (chaffed) 20lb. Maize Silage	2	282¼	141½	297	3·9	3·7	14¾
Ditto	10lb. Maize Stover, with Treacle 20lb. Sliced Roots	2	323¾	150	363¾	4·7	4·7	40
Ditto	10lb. Lucerne Hay (chaffed) 20lb. Maize Silage	2	216½	107	292¼	4·3	4·3	75¾

The above results disclose a number of interesting facts, of which the most noteworthy is the high value of lucerne hay as a milk producer. The substitution of 10 ℔. of lucerne hay for an equal quantity of maize stover had the effect of increasing the milk flow in cows of comparatively poor capacity by 2 5-7th ℔. per diem. It further appears that a whole maize roughage ration consisting of stover and silage is the least desirable of those employed, the substitution of roots leading to considerably better results where maize stover formed the dry element of the roughage. That this was due to the beneficial influence of variety in the ration may be seen from the fact that roots and maize silage fed in conjunction with grass hay gave almost identical results, which, however, slightly favoured the silage. This is in keeping with American findings, which attribute equal values to roots and silage, though cost of production is generally lower in the latter case. The substitution of 5 ℔. millet hay for an equal quantity of grass hay led to a slight reduction in milk flow, but it is anticipated that his finding may possibly be reversed in further experiments. It will be noted that throughout these trials the character of the rations has had no very definite effect upon the butter-fat percentage, which result only confirms the generally accepted statement that the composition of milk is little, if at all, altered by a change in the nature of food, but is rather an hereditary feature to be bred into a herd by selection. On the other hand, the character of the food undoubtedly affects the churnability of the butter-fat, or, in other words, the proportion of total butter-fat obtained by churning; and pending completion of determinations in this connection, the following instances may be advanced:

	Per cent.
Grazing alone	86·64
Hay, mealie meal and bran	84·18
Hay and bran	81·37
Ensilage alone	81·25
Hay and mealie meal	74·63
Ensilage and mealie meal	65·69

A general survey of our experiments, as carried to the point recorded, reveals the fact that it has been possible to increase the milk production of graded and native cows by as much as 7 ℔. per diem by substituting for an ordinary roughage ration of 20 ℔. maize silage and 10 ℔. maize stover, the complete ration of 4 ℔. mealie meal, 2 ℔. oil cake, 10 ℔. lucerne hay and 20 ℔. maize silage. If the difference in cost of production between lucerne and treacled maize stover be taken as 1s. per hundred, the value of inferior maize as 2s. 6d. per hundred on the farm, and the purchase price of oil-cake as ¾d. per ℔., the cost of producing the additional 7 ℔. of milk is approximately 4d., of which the butter-fat at 4 per cent. and 1-5d. would realise 4 4-5d., leaving the farmer in possession of 6¾ ℔. of skim milk for calf rearing or pig feeding, which will have cost him nothing. The indirect advantages to patrons of creameries resulting from the maintenance of a full supply of butter-fat during the winter will be self-apparent, a profitable outlet is found for quantities of inferior mealies, and also a means for establishing an industry in pork and bacon as an adjunct to the creamery in the most favourable conditions.

The system detailed above has been purposely applied to cows which would under ordinary treatment be classed as unprofitable from the dairyman's standpoint, and its extension to animals possessing better milk machinery will, it is confidently anticipated, lead to the establishment of a far wider margin of profit.

(*To be continued.*)

Sugar from Charcoal.—Mr. Charles P. Stewart, of Los Angeles, California, claims to have invented a process for making sugar from charcoal. In an experiment, described in *Popular Mechanics* (Chicago), the inventor took an armful of pine wood, eucalyptus, mealie cobs, a piece of old buggy, and a barrel hoop, and piled them into an oven, where they were made into charcoal. The charcoal ready, he put 32℔s. of it into the retort and started the fire under his water boiler. Twenty minutes later, when things were getting hot, he started the air compressor and a set of highly charged electrodes. The water, converted into steam, passed through a heater, where it was dissociated into hydrogen and oxygen at a temperature of 3,000 degrees. The mixture of gases was then compressed upon the carbon heated to a like temperature. Then he let the compressed gas flow past the electrodes, and a fine spray of powdered sugar burst from the end of the pipe. Thirty minutes later it ceased. The output was about 70℔s. of sugar. It is claimed that sugar can be produced commercially at a cost of only a halfpenny a pound. The idea itself is commented upon by Dr. Jas. Lawrie, of the Miner-Lawrie Laboratories, Chicago, as feasible. He remarks that, as sugar contains the elements carbon, hydrogen, and oxygen, in the proportions $C12$, $H22$, $O11$, in which the hydrogen and oxygen bear the same relationship as they do in water—namely, two parts of hydrogen to one of oxygen—the invention has thus all the starting material necessary, at practically no cost. The only problem was the combining of this material in the desired proportions of 12 parts of carbon to 11 of water.

The Fibre Industry of Mauritius.

By Leonard Acutt, J.P., Tongaat.
(Member of the Natal Land Board).

In all districts of Natal there are to be found large areas of land which, from their position, or want of rainfall, are, although fertile, not suitable for the growth of any of our staple crops, or even for the grazing of stock.

On the Coast, with its greater heat and rainfall, there are thousands of acres of good land which are not suitable for sugar, tea, fruit, or any of the recognised products of the district, while in the more temperate midland and up-country districts, there is perhaps even a greater extent of land which is not suitable for the growth of wattles, English fruits, potatoes, oat-hay, mealies, etc., nor for the economic grazing of animals. It is, therefore, of the utmost importance that no opportunity should be lost to introduce such industries as promise to be suitable to what may be termed our waste lands, and that our farmers may have the choice of as many crops as possible.

Lately attention has been called to the fibre cultivation as an industry of this kind. In spite of the fact that some aloe-growing syndicates and companies have started operations, it was felt by some of our most prominent men both on the Coast and in the upper districts that it would be worth the while of the country to obtain a full report from Mauritius as to the present conditions and future prospects of the aloe fibre industry in that island. Money was subscribed towards the expense of such report, the Agricultural Department gave a grant on the £ for £ principle; and it was arranged that I should visit Mauritius; and, having just returned, I have the honour to submit my report for general information.

I may say that Mauritius, as the steamship sailings and other matters are at present arranged, is not an easy place to get to, nor is there any certainty of getting away again by any specified time.

There is an elasticity in the term "on or about" in connection with the advertised dates of sailings under which much delay is possible. The Union-Castle boats run irregularly and start from Delagoa Bay, and one experiences great difficulty in finding out to a day or two the date of sailing from that port, and also getting there in time for the steamer. Again, return tickets are not issued, and the Imperial Government having the first call on the accommodation, one cannot be sure of a return passage. Add to this the risk of quarantine at either port, and it will be seen that one stands more than an off chance of being delayed a month. However, in my case the delay was all this end, and I was not delayed at Delagoa Bay or Mauritius.

The steamer had to go to Beira, and from there down the west coast and along the south coast of Madagascar, of which good views were obtained, then round the north of Reunion to Mauritius, the voyage from Durban, including stays at the ports, occupying 11 days.

MAURITIUS.

A short sketch of the history and main features of Mauritius will not be out of place here, and will doubtless be of interest to many Natalians.

The island was discovered by the Portuguese about 1507, and was called Ilha de Cerne. There were no inhabitants or traces of any. The Portuguese retained a nominal possession till 1598, when a Dutch squadron took formal possession, and called it Mauritius, in honour of Prince Maurice of Nassau, still leaving it uninhabited till 1644, when they made three settlements and built a port at Grandport to assist in the suppression of piracy. The Dutch, finding it unprofitable and troublesome, abandoned it in 1710 or 1712. In 1715 the French took possession and changed its name to Isle de France. Six years later it was ceded to the French East India Company, who, in 1734, sent out the famous Mahe de Labourdonnais, a man of eminent talents. He introduced the cultivation of sugar cane, cotton and indigo, made roads and established a capital at Port Louis.

In 1767 the island reverted to the Crown of France, and in 1810 came into the possession of the English. That possession was confirmed by the Treaty of Paris in 1814, and Mauritius is now a British Crown Colony.

The approach to Port Louis and the position of the town remind one of Capetown. The mountains, though not of the same height, tower over and dominate the town in the same way that Table Mountain does Capetown, but in Mauritius the mountains are not flat topped, but a series of peaks. The highest point of the island is 2,870 feet above the sea.

Mauritius is not subject to as great ranges of temperature as we get in Natal. Over a period of 13 years the mean temperature in shade was 73·8 degrees, with a maximum of 88·8 degrees, and a minimum of 54·1 degrees.

The rainfall varies greatly in different districts. The mean, taken over a period of 17 years, at eight stations, was 68·78 inches. The highest record was that of Cluny, Grandport—203·50 inches—while the mean at that place for 25 years was 142·26 inches. At Port Louis, which appears to be the driest district of the island, the rainfall is very little more than that of the coast of Natal, the mean over 25 years being 45·65 inches, our coast rainfall being about 41 inches, taking the mean over 40 years.

The population of the island at the last census was 375,400. The lowest recorded death rate per thousand over a period of 72 years was 24·90. In 1867 malarial fever appeared for the first time, and the mortality in that year reached the appalling figure of 125·11 per thousand. For the last five years it has been 37·3 per thousand, which is not much higher than before the fever made its first appearance.

Port Louis is distant from Durban a little over 1,500 miles.

The value of the exports from Mauritius in 1905 was £2,232,000, the chief item, of course, being sugar.

But the point which has the greatest interest for us in South Africa, with our almost limitless distances, is the small size of the island—the extreme length is only 34 miles, and the extreme width is only 22 miles, the total area being 713 square miles, or 456,320 acres. Compare this with the area of Natal, exclusive of Zululand (as given by Mr. Mullens in his "Economic Side of Agriculture in Natal," published in the July *Agricultural Journal*—16,000,000 acres. Or imagine the island put down on some of our flat country: it would not be an impossible feat to ride round it in a day. We cannot but wonder, when we imagine the known given points in Natal between which the island could be put, at the population it carries and the great extent and value of its agricultural products. It has produced as much as 212,000 tons of sugar in a year, and our highest output in Natal has been barely over 30,000 tons.

One would naturally expect to see every inch of such a small country cultivated, but there are large tracts of land which, from steepness or poor rainfall, are not producing anything.

The soil is volcanic and generally of a red colour, but I should say is of a more porous character than our volcanic soils on the coast of Natal.

THE FIBRE INDUSTRY.

Fibre was first made from aloes in Mauritius in 1870, and in 1889 we find that the export of fibre was of a value of £100,000. It was extensively cultivated, but owing to a drop in price it was to some extent abandoned, but is now being taken up again. There are four plants from which fibre is manufactured:—(*a*) *Creole aloe;* (*b*) *Sisal aloe;* (*c*) *Agave Americana;* (*d*) *Sanseviera.* (I give the names by which they are known in Mauritius.)

The Creole aloe is the plant from which the bulk of the fibre is produced. This plant appears to be identical with the smooth-leaved, light green coloured aloe which is found so widely spread on our coast lands.

The Sisal aloe seems to be the same as the spike-leaved dark blue green aloe which is also to be found on most coast farms.

The *Agave Americana* is a smaller plant, somewhat resembling the Sisal. I do not think it is widely spread here.

The Sanseviera is now being experimented with and plantations are being made. It is, in appearance, like some wild plants which are to be found in many parts of the country here.

As stated, the crop of fibre may be said to be nearly all produced from the Creole aloe. I expected to find more attention paid to Sisal, but it is almost neglected, as it takes longer to grow and costs more to manufacture; and, although the price is somewhat higher, the Creole aloe gives the larger profit.

The *Agave Americana* is cut wherever found and the leaves put in with those of the Creole aloe in manufacture, but is not much in favour.

The Sanseviera is still only in the sample stage, but is certainly a coming fibre plant, the percentage of fibre being large.

Although the soil of the island is rich, the aloe is found growing well in places where there is very little soil, and almost on rocks. I do not think that richness of soil is a great factor in the production of fibre in Mauritius. Neither is extreme rainfall a factor, as all agree that the driest parts of the island produce the largest percentage of fibre, and that the dry season is better than the wet in this respect.

In a country producing so much fibre it would naturally be thought that large fields of the aloe would be found, but this is not the case at present. In the past there were fields of aloes, but beyond some few new plantations nothing is to be seen of cultivated aloes, and the crops of fibre now being obtained are got from wild plants. Whether the Creole aloe is indigenous to Mauritius or whether it was introduced at some remote period I could not ascertain, but it has taken charge of the entire country and is to be found growing everywhere, from the sea shore to the very mountain tops.

Some factory owners cut the leaves themselves, either from their own lands, or where they have arranged with owners of land or the Government to pay a royalty either on the leaves cut or on the weight of fibre produced. Other mill-owners contract for the supply of leaves, others again purchase leaves from coolies or anybody who will deliver them at the mill. One owner was cutting leaves from Crown lands, paying a royalty of about 30s. per ton on the dry fibre produced. He said he could pay more than that and make a profit. It seemed to me that the cost of collecting the leaves from aloes which are growing among rocks and ground covered with thorny shrubs and creepers must be very considerable, and go a long way towards neutralising the apparent advantage of getting them practically for nothing. At one place I saw leaves being collected from well up a steep mountain side, so steep that a wire rope had to be used to get down to the carts, into which the leaves were loaded and taken perhaps a mile or more to the factory.

The mode of cutting is to tie up as many of the centre leaves of the plant as it is intended to leave, and cut all below these and as close to the stem as practicable. This tying up is apparently done by men who can be trusted, then the rank and file of the men and women know what to do. The question of how many leaves to tie up is a matter of discretion, for the more leaves there are left uncut, the sooner can another cutting be made, and the more leaves you cut, the bigger the crop for that year. It will occur to most of us that if we are paying a royalty only, and have no certainty of securing the next and succeeding crops, every possible leaf will be secured, whereas if the land belongs to the factory-owner the future crops will be considered in instructing the tyers how many leaves to tie up, and this is precisely what happens in Mauritius.

The general mode of transport of the leaves to factories is a small cart drawn by a Madagascar ox in shafts; in some cases the ox has a regular set of harness—collar, saddle, etc.—but for the most part our yoke, keys, and strop are used. The ox generally has a bit in his mouth, or a string in his nose. The greater part of the transport of the island (outside of the railways and tram lines) is done by these single ox carts, and a lot of work is done by these small units. The oxen are shod and as a rule are well conditioned. I have seen some heavy loads of sugar cane on such carts: I should judge at least 1,500 lbs. Roads are, of course, well graded and good where such loads are carried.

The plantations of Creole aloe now being made vary in distance apart of the plants from three feet each way to five feet each way. Some prefer the plants to be closer in the rows than between the rows, and I heard three feet by four feet and four feet by five feet advocated. The Sisal is planted wider, as much as eight feet each way being adopted, but the plantations of anything but the Creole aloe are not extensive.

The plants should be as large as possible when put in the fields,—certainly from three to four years old. If the young bulbs are planted, a large percentage die, and before cutting can be done from a full field planted with such young plants eight or even ten years may elapse.

The cultivation of the Creole aloe is of the roughest possible description, consisting merely of occasionally drawing the weeds and rubbish away from the plants and leaving it in the middle of the rows. One of the great objections to the Sisal is that it requires much more cultivation; not only must it be kept clearer of weeds and rubbish, but the suckers must be removed from time to time—and the plant appears to sucker very freely.

As all the aloe leaves now being cut are from wild plants, it is impossible to say what the yield of fibre per acre is. I was told that it would yield as much as one ton per acre, but the general opinion seemed to be that from half-a-ton to fifteen hundred pounds would be nearer the mark but no one can really give reliable information on this point. The yield of dry fibre may be put down at 2½ per cent. of the weight of leaves. I have the following actual figures from one factory:—

Sisal yielded 2·92 per cent.
Creole aloe yielded 2·35 per cent.

I should think it very probable that we may look for a higher percentage of extraction than this in Natal, on account of the dryness of the climate.

The machinery used in the manufacture of aloe fibre is of the simplest possible description. The main machine, the scraper, or "Gratte," as it is termed in Mauritius, is shown in a wood-cut in the *Agricultural Journal* of July 26th, 1907, in Mr. Sim's article on fibre. It consists of a drum with angle iron bolted on across, and revolving at a speed of 600 revolutions a minute. The drum revolves towards the feeder, and a very small space is left between the angle iron and the service plate, so that the skin and pulp get scraped off the leaves. This is done dry—no water being used at this stage. The machine strikes one as being very primitive and as if it would not be difficult to invent something which would do the work better. I saw at the Forges et Fonderies, in Port Louis, a machine which has just been made, but it did not commend itself to me as being practical. It seems as if water ought to be used in pulping.

The "grattes" are covered in, and the aloe leaves are fed through a slit which just prevents a man's hand being drawn in. The men employed feeding the leaves to the machines wear gloves to protect their hands from the juices of the aloe. Each leaf has to be presented to the machine separately, allowed to be drawn half-way in, then withdrawn and turned round, and the other half treated in the same way and withdrawn. The treated leaves are in some cases just dropped on the ground, in others hung over iron bars. The angle irons at some factories were kept sharpened, in others worked just as they were; and I think the unsharpened irons did the better work.

After the scraping, the green fibre is put into a cement tank with fresh water enough to cover it, where it remains for about six hours. It is then taken out and put into another tank with clean water, where it does not remain long, but is taken out in convenient sized masses and beaten by women with blocks of wood on the walls of the cement tank, and after this process it is thrown into tank No. 3, in which is soap and water in the proportion of 1 ℔. of soap to 200 ℔s. of green fibre. The soap is melted and boiled up in tins or boilers and added as the water flows into the tank. Hot water is recommended for this tank, but cold water is more generally used. In this tank the fibre remains for from 20 to 40 hours—the exact time being a matter of experience. From this it passes to No. 4 tank, which has clean water in it, and it is here washed finally and taken out to the drying grounds, where it is hung on sticks or wires to dry.

From the drying grounds it is brought into the factory and goes through a machine called a "Batteuse." This is a similar machine to the "Gratte," only the angle irons are not so close together and run at different speed. The feeding man allows a large lot of the dry fibre to be drawn into the machine, where it gets a battering about and gets a lot of the dry mucilage knocked off; he draws it out again and presents the other end, so that the process is the same as with the leaves as they come from the field.

After this process the fibre is all picked over by coolie women, each using a large pair of scissors, with which they cut out any pieces which may be discoloured, or be stuck together with mucilage which still remains after the processes described. It is then ready for baling. The baling presses used are mostly hand presses with two screws, and the bales are banded with ropes made from the waste fibre. The bales run from five to six to the long ton.

The amount of refuse is, of course, great, as a factory producing one ton of dry fibre a day will have nearly forty tons of green slime to get rid of besides the water from the tanks. The slime is taken out on to the fields of cane near, or disposed of on waste lands, and the water is run also on to the land in furrows. I did not observe any nuisance from this refuse at any factory, either in bad smells or polluted streams. The refuse is, of course, a good fertiliser.

The motive power used is water power (which is, of course, the cheapest), electricity, and steam. The amount of water necessary is not great and will not stand in the way of small factories being put up in any part of Natal. For a factory turning out a ton of fibre a day the amount of water required is given at 2,000 gallons per day. This, I think, is perhaps an underestimate, and 3,000 gallons might be required; but a factory turning out a ton of dry fibre a day is a large one, and I did not see any of that size, a capacity of from half to three-quarters of a ton daily being the rule.

The aloe leaves will not keep after being cut, but must be dealt with as soon as possible. The effect of keeping is, not to cause any deterioration in the strength of the fibre, but to produce a bad-coloured article which is only saleable at a lower price.

I find that sugar-growing for Central Mills is carried on together with the aloe fibre industry, and this would be practicable on the Coast Lands of Natal. The refuse from the fibre factory provides manure for the cane fields. The crushing season is short, and during its continuance the fibre factories stop working if necessary, and put all forces of labour and transport on to getting off the cane crop; and, as fibre-making goes on all the year round, the two industries fit in well together.

The price of fibre is ruled mainly by that of manilla hemp, although it is claimed for the aloe fibre that it can be used to some extent in the manufacture of textile fabrics, being mixed with cotton, flax and wool, which is not the case with manilla hemp, nor, I should imagine, with Sisal fibre, from its great coarseness compared with aloe fibre. The prices at present at Port Louis are:

	£	s.	d.	
Prime, about	23	10	0	per ton.
Good, about	21	10	0	,,
Fair, about	20	0	0	,,

The value of fibre shipped from Mauritius for the four years 1902-5 is given as—

	£
1902	62,523
1903	36,749
1904	41,834
1905	37,636

The number of aloe factories is given as 48. Whether these are all working or not I cannot say, but if they are, the average output per factory was only 38½ tons for the year 1905.

A plant of machinery capable of turning out 1 ton of dry fibre per day would require 30 h.p. to work.

I have two estimates for the machinery without the driving power. The estimate which is most complete gives a price of £325 for a ton-a-day plant delivered Port Louis. If to this be added the cost of 30 h.p. steam, water, or electricity, the further outlay for buildings, tanks, etc., can be estimated and the probable cost of a ton-a-day plant complete can be fairly well arrived at.

It is well known that it is difficult to get at the cost of any one operation in any industry, and I find my notes somewhat conflicting on the point of manufacture alone, but going carefully over the figures I conclude that £4 will cover the expense of making a ton of dry fibre. The cost of growing and transporting the leaves, it is impossible to arrive at. I found, however, at one factory that 5s. per ton was paid for leaves, delivered. This would be £10 for leaves enough to make a ton of fibre. It will be said that, as the leaves are wild, this does not include cost of production of them, but the cost of obtaining the wild leaves appears to me to be so great, getting here a few leaves, and there a few, and having to cut paths to them through thorns and scrub, that the growing of them in more accessible positions would cost little, if any, more. In my estimate of £4 per ton for factory expenses, I have charged the labour at Natal prices and believe I am within the mark. Coolie labour in Mauritius costs 10d. per day, and is of a better class at that price than our labour, costing 1s. 6d. per day for all charges.

There is no place in Mauritius where the aloe leaves are dealt with in the fields to save the excessive transport to the factory. Were it possible to do the first process of scraping in the fields, 30 to 35 tons out of the 40 tons' weight of leaves necessary to make a ton of dry fibre would be got rid of, but with the present process, this would mean arranging for the bulk of the machinery and power to be rendered portable. With very large plantations comprising many thousands of acres, involving long distances of transport this might be done. It would probably then only mean the establishment of centres where this concentration could be done, and might really involve as much transport as is required to take the leaves entire to the present small factories. I cannot imagine any machine which could be moved up the rows and do absolutely away with the transport of the leaves.

With regard to the age at which the cropping of the plants may commence: opinions vary on this point as much as on others. So much depends upon what age the plants are when put out in the fields. If very young plants are planted, all planters agree that a very long time may elapse before cutting can commence; one planter put it at 10 years, but if a well grown plant is selected, either from wild stock or from plant beds, plants of perhaps two years old, rejecting all backward plants, leaves may be cut in four years and continue to yield for from 10 to 15 years before requiring to be replaced.

I think the foregoing gives fairly all the information on all points of the aloe culture and manufacture which is to be obtained in Mauritius, and it only remains for me to remark on the possibilities before the industry in our Colony.

NATAL'S POSSIBILITIES.

First, with regard to what plant we should cultivate to produce fibre:

Now, we find that the fibre produced in Mauritius is, one may say, wholly made from the Creole aloe, and that this is the kind which is being extensively planted out. Plantations of other kinds are made on a small scale, but the Creole aloe is as much the mainstay of the fibre industry in Mauritius as the Yuba variety of sugar cane is of the sugar industry in Natal.

Whether the Creole aloe of Mauritius is identical with the *Furcraea* as known in Natal can surely be settled very shortly by obtaining the plant from Mauritius, or rather such parts of it as are necessary to enable botanists to decide the point. It is probably identical; at any rate our plant yields a good fibre. Mr. Sim, in his paper on "Sisal, Mauritius Hemp, and other 'Aloe' Fibre," after reviewing the difficulty and cost of obtaining Sisal plants in sufficient quantities to start a large industry, says: "The whole question seems to turn on whether the kind we have here (*Furcraea*), and of which plants are easily and cheaply obtainable, is sufficiently good to go on with meantime until these points are cleared up, and until a large supply of Sisal can be raised locally, or obtained from East Africa or elsewhere on terms which are not prohibitive."

I think the answer to this must be that our plant should receive our first attention and that experiments should be made with "Sisal" to prove its suitability to our climate and conditions.

I was much struck with the Sanseviera, and trust that both this and the *Agave Americana* (so called in Mauritius) will receive attention. Further than that, the whole question of the fibre supply of the world is of so much importance that I would advocate a thorough scrutiny of our native plants and grasses known to be rich in fibre, and our experiment farms in all parts of the Colony could not do better than devote part of their space to the cultivation of these wild plants.

Now, with regard to the suitability of the fibre industry for Natal:

I have estimated that fibre can be manufactured from the leaf for £4 per ton, and it is not for me to say what the cost of producing aloe leaves enough to make a ton of fibre and delivering them at a factory will be. In the first place I could gain no information on this point in Mauritius; again, cost of production in one place may be low, but cost of transport high, or the reverse may be the case. Then labour is a factor; and there are many things which may make costs of either operation vary very considerably in different districts.

In Mauritius, in reply to my queries as to what it cost to collect the aloe leaves and transport them to factory sufficient to make a ton of fibre and to bring same to a marketable condition, I received replies that the total cost would vary from £15 to £17 a ton; and that in many districts of Natal it can be made at that cost I do not doubt.

The main danger we have here threatening any aloe plantations is that of fire. The cultivation of the Creole aloe need only be of the roughest possible description, but a rough cultivation in this country means a quantity of grass and debris which becomes dangerously inflammable in the winter In Mauritius this does not occur, the grass and debris is not, beyond in small patches, inflammable at any time of the year. Therefore either cultivation would have to be done to keep down the grass, or we should have to be careful to prevent outside fires coming in, and keep all roads and paths in the plantations themselves free of inflammable material.

I think that on the coast lands of Natal, sugar-growing for central factories can be worked in with aloe-growing, in the same way as obtains in Mauritius. Two or more small farmers, or a group of cane farmers, could have a small factory of a capacity of, say, 50 or 100 tons of fibre per annum. This would not cost more than a few hundred pounds and would only require some 8 horse power; and a gross return of one or two thousand pounds sterling would be a welcome sum to come in between the cane crops. A good manure would be obtained for the cane fields, and the farmers would be able to utilise land which would not carry crops of sugar cane. Inland of the immediate coast belt, and up to the 2,000 feet level, there is a lot of land which could be used for aloe growing, land which, though good, is too dry to carry crops of the ordinary character in the winter, but which would grow aloes. I do not doubt that there are many districts in the upper part of the country in which aloes would do well. Many parts of the "Thorns" certainly would, and there are thousands of acres which are fit for no other crop, by reason of stones and poor rainfall.

I think this would be a crop which the natives might be encouraged to grow. Young plants might be scattered broadcast in kloofs and sheltered spots in locations; and the aloe might take charge of such places as it has done to such an extent in Mauritius, and prove a source of income in a few years' time and make productive a large area of land on which nothing else can be produced.

There is no doubt in my mind that the aloe fibre industry will prove a useful one to our Colony; and, while not promising large fortunes, in a few years without any trouble will prove more payable than many enterprises in which our farmers are now engaged, besides making use of parts of farms on the better land of which other crops are being grown, and bringing whole districts into a productive condition.

I must sound a note of warning on some important points:—

The first that occurs to me is that of the plants which may be used. Any plants with which plantations are formed should be well grown. A great many suitable plants can be got from self-sown aloes, but for large plantations they must be raised in beds; the young plants must be collected and planted in rows in ground properly prepared. These will soon develop into plants which, when put out in the fields, are vigorous and well grown, and which may be cut for fibre-making in from 3 to 5 years, whereas, if too young plants are put out in the main plantations, it will be a long time before the first crop can be cut.

It should be borne in mind that it is not the province of those who first attempt to establish a new industry to spend money in experimenting in machinery; and until a company is doing well and has got a fair start, none but the most thoroughly proved plant should be erected.

I would advise those going in for aloe plantations not to figure on a greater annual crop than 1,000 lbs. per acre, and even this amount may not be obtained for the first cutting if a liberal number of leaves is left for future crops.

But the most important matter in connection with fibre-growing is the way in which the fields are laid out. Let it always be borne in mind that to obtain one ton of fibre some 40 tons of leaves have to be transported. It will be obvious that the tranport of this tonnage will always form the most expensive item in the whole of the operations, and therefore the fields should be laid out in relation to the factory so that the minimum of traction is necessary; and roads or tram lines should be laid cut before the fields are planted, or, at any rate, before the aloes grow to any size.

But, even with a good system of roads, it may not be easy to get the leaves to them. Imagine, say, 600 acres covered with aloes well grown and ready for yielding a cutting of leaves. How are the cutters to get at the leaves and carry them to the roads through the interleaved mass which the field will then present? In cutting a field of sugar cane, cutting is begun at a road or tram line, and any part which is cut leaves the ground clear and facilitates the access to the uncut parts, and canes can be carried across any part of the field which is cut, and so reach the roads or tram lines. But this is not the case with an aloe field; the cut portion is very little easier to get through than that which has not been touched, and provision must be made for getting easily from the fields to the roads, or the cost of cutting and carrying will be heavy. Whether it would be better to plant 2 rows rather closer together and leave a practicable path down the next rows or whether in some other way it is arranged that the cutters can easily reach a path, I am not prepared to say, but it will be obvious the provision must be made for easy access to the roads.

These points are of the utmost importance. Any attempt to establish fields of aloes with very young plants, any waste of money in experimenting with machinery, or any neglect in laying out roads and fields properly, will be bound to cause disappointment and loss and might wreck the first efforts to establish this industry, and throw discredit upon it from which it would be up-hill work to recover.

With regard to machinery: that in use in Mauritius, although rough, has the advantage of being applicable to small or large factories. One could begin with one "Gratte," which would only take some 6 or 8 horse power and make a ton of fibre a week, dealing with the produce of about 100 acres of aloes in a year, and add to it as one's further acreage came into bearing. And for acreages under 1,000 it is probably the most suitable machine, and not until plantations run into thousands of acres need portable machinery be considered.

To conclude, I must here tender my most sincere thanks to my friends in Mauritius for the free manner in which they gave me every information in their power, at times at the cost of giving up a day to me and showing me the best in their districts. I knew no one in Mauritius when I landed in Port Louis, and had it not been for the kindness of those to whom I had introductions, and of those to whom I was introduced, I should have had great difficulty in getting the information I required. I shall always gratefully remember the kindness and hospitality of the people of Mauritius.

Export of Citrus Fruits.

MR. F. L. WHITE'S REPORT.

The following report on Natal citrus fruits exported to the English and Continental markets during this season has been submitted to the Minister of Agriculture by Mr. F. L. White, who, it will be remembered, accompanied the preliminary consignments to England and arranged for the marketing of the fruit there.

"To the Hon. Minister of Agriculture,—

"I have pleasure in handing you herewith my report on the citrus fruit exported during the present season and on the many lessons to be learned by Natal farmers.

ORANGES.

"I found these accepted well in the provincial markets and the prices obtained for them to be very satisfactory, but the wastage and loss during the voyage so dwindled the returns to the grower as to be a failure from his point of view. The general concensus of opinion amongst dealers was that our oranges had not sufficient colour to command a high figure, and were too sour for the taste of the English public. I certainly noticed that our fruit, although full of juice, always showed that it had been grafted on to lemon stocks, and this I consider a great mistake when the fruit is required for export purposes. I strongly recommend growers who are planting orchards of this fruit to try the up-to-date Washington Navel (of the California grower, which has been universally accepted as the best export orange).

"In packing the orange for export no wood-wool should be used, but all cases should be packed tightly and an even pressure put upon the fruit by the lid, when the case is nailed down. The very greatest care should be exercised in seeing that no stung fruit is packed, and fruit should be picked at least five days before being packed—the fruit being stored during that time in cool, dry sheds or store rooms. Natal oranges, especially those grown on the Coast, rapidly lose their bright fresh appearance after being picked. This, I believe, is caused by too much moisture in the cells of the skin, and could be overcome by judicious manuring, pruning and cultivation. I do not advocate packing oranges in such large cases as those used by the Spanish growers, but in a standard case holding 100 to 120 fruits, which should be of as uniform size as possible.

"Oranges will never command fancy prices in England again, as so many countries have larger orchards and oranges do not find a ready sale when the English soft fruits, such as cherries, gooseberries and strawberries, are in season, *i.e.,* during the same months as the Natal orange ripens, June, July, and August. The conclusion I arrived at was that a trade could be built up if growers would plant the varieties that are suitable and pack them in up-to-date methods.

NAARTJES.

"This fruit met with really a fine reception in the London and provincial markets during June, partly on account of the scarcity of English fruit due to the cold and wet summer of this year, and to the fact that the California fruit was rapidly getting scarcer, and because Madeira, the Canaries and the Azores had very little fruit to offer the English market. I am fully persuaded that the Natal naartjes will be looked for next summer and that an export trade in this fruit is established.

PICKING.

"Naartjes should not be picked for export until fully ripe and well coloured, as the buyer in England looks for colour and studies *appearance first,* and fruit of good colour takes preference to that which may be larger but of a paler shade.

PACKING.

"The universal opinion expressed was that the tray of 14in. x 12in. x 2in., containing 24 fruits, was the best sent Home this year. Not only did the fruit carry better and present a better appearance whilst in single layers, but these trays were preferred by all buyers although they held less fruit than the boxes, and consequently they were paying a higher rate for their fruit. For future shipments I would advocate the use of even a smaller tray, holding only 12 fruits, and measuring 12in. x 9in. x 2in. In packing naartjes for export, the very smallest quantity of wood-wool should be used, whilst in the trays of one layer of fruit no wood-wool is required. All fruit should, of course, be wrapped in paper; the proper white or tinted fruit wrappers only being used.

"All cases or trays of citrus fruit should be tightly packed and no space should be left for the fruit to work loose while on the journey. In order to pack citrus fruits tightly the fruit should be cut a week before date of shipping and stored in the coolest place procurable, and the very greatest care should be exercised that no stung, scarred, damaged or fallen fruit is included.

"I am perfectly convinced that naartjes can be kept in cool storage for three months with only 2 per cent. loss, because in opening up trays in London from the shipments received after the 1st July from some senders, no loss was found, and in cases of 100 where the same sender had packed fruit which he had not so carefully selected the loss was sometimes as high as 15 per cent., proving conclusively, to my mind, that the carrying capacity of this fruit is far beyond what exporters have imagined.

"The average price received in London was 8s. to 10s. per 100, and I feel sure that there is almost an unlimited sale for good fruit at this price. Of course, when freight charges at this end and expenses and commissions for selling in England are deducted from the returns, there has not been a big margin left for the farmer, but charges must be kept down as low as possible and freights in cool chamber at a lower rate than 70s. (which practically means 2s. per 100 for freight) arranged for, and also a thoroughly well organised means of distribution in England of the regular consignments by an appointed agent or agents. With these facilities I have no doubt that the export trade will be firmly established.

"I have already mentioned the great importance of colour in the fruit, and I must again impress upon all growers to cultivate whatever crops they have upon their lands, and in the case of citrus fruits to irrigate and manure their trees, prune where necessary, and if their fruit lacks colour to use copperas (sulphate of iron) to the roots in order to produce the necessary colour appearance which is so greatly in demand in the European market.

"And now to summarise the

LESSONS LEARNT

by me, in a few words: First, no fruit should be picked for export and shipped that is not fully matured and of good colour. Second, all cases should be well and tightly filled with fruit and very little or no woodwool used in packing. Third, fruit to be cut seven days before shipping, and no fruit included in cases that shows any signs of deterioration.

"I have, of course, not gone into the question of the Government opening up an Agency in England, but I would suggest that this matter be thoroughly investigated by you and if possible a Government Agent appointed in London to distribute Natal produce. All the consignments sent me were handled by Messrs. Hudson & Sons, Cannon Street, which firm handles quite 75 per cent. of the fruit sent Home from the Cape.

"As I understand the Secretary of the Natal Orchard Association is drawing up a return of the cost and expenses in handling Natal fruit, I prefer to leave my suggestions on this matter until this is published.—Yours, etc.,

"FRANK L. WHITE.

"Durban, 20th Sept., 1907."

If an egg is broken in the feed of horses occasionally, the result is stated to be highly beneficial. It has a tendency to clear the skin and make the hair take on a bright, healthy appearance.

Tobacco Cultivation in South Africa.

WITH SPECIAL REFERENCE TO NATAL.

By E. R. SAWER, Director Experiment Stations.

TOBACCO MANURES AND FERTILISERS.

TOBACCOS, other than chewing leaf and snuffs, are cultivated and manufactured for the products of combustion or smoke, and their burning qualities are therefore of the first importance. The term "burn," as applied to tobacco, has reference to several well defined features which have all to be considered by the planter and manufacturer. To be acceptable to buyers the cured leaf must hold fire steadily and evenly without a tendency to "coal" or "carbonize" in advance of the actual burning area. Combustion must be sufficiently gradual to prevent flaming or explosive action, and the market further demands that the mineral residue, or "ash," shall be white in colour and firmly coherent. The absence of any of these qualities will seriously discount value of the leaf or manufactured products, and as they can be controlled by careful choice of locality, soil and manures, a discussion of the methods available for ensuring a satisfactory result will not be out of place.

Tobacco leaf is characterised by a high content of mineral matter, which often exceeds 20 per cent. of the total weight and exercises an all important influence on the combustion of the organic material. The glowing capacity of tobacco is dependent upon the large proportion of mineral salts, and if these be extracted the leaf will burn with a flame. It thus often happens that coarse and rank leaf shows a tendency to flare when lighted, which result is due to a marked deficiency in mineral constituents; and, similarly, the removal of soluble salts by "washing" or "dipping" of the leaf prior to rolling may injuriously affect burning qualities. Certain substances interfere with combustion while others favour it, and the relative proportions of the former and the latter will determine the character of the burn.

The difficulty of securing a sufficiency of kraal manure during the present season, owing to the ravages of East Coast Fever amongst our cattle, lends an additional importance to commercial fertilisers as an alternative. This outcome is not to be altogether regretted, for the unlimited employment of coarse organic manures has in the past lowered the standard of much of the local leaf, and the substitution of mineral fertilisers should have the desired effect of producing a finer type of leaf with more delicate aroma.

A certain amount of organic matter in the soil is, however, essential to good results and further assists in retaining moisture during periods of drought. If deficient this is best supplied by plowing under a green manure crop either before or after the planting of tobacco. Lupines, red kafir bean, cow-pea and soy bean are available for this purpose, and should be harrowed down with the cut-away disc and ploughed under while in flower. In this way exhaustion of the soil may be prevented and the same land repeatedly cropped with tobacco.

Many of the fertilisers in general use with staple crops are quite unsuitable for tobacco, and selection must be based upon a clear knowledge of the influence of the different available salts on the burning qualities of the leaf. It has been repeatedly demonstrated that all chlorides and sulphates injure the burn and fire-holding capacity of the leaf, while, on the other hand, salts of potash and lime must be furnished in some form. The fire-holding capacity is indeed dependent upon the presence of potash, and lime is required for the production of a well coloured coherent ash. Phosphates are practically neutral in their effect on the burn, but beneficial in so far as they may increase the vigour of the crop without impairing the quality of the product. Where a light, mild-flavoured leaf is desired, nitrogenous manures should be used sparingly, as they have a marked effect on the percentage of nicotine, and are consequently indicated, on the other hand, for plug, snuff and other heavy classes of tobacco.

The majority of our proved tobacco soils contain an appreciable percentage of lime, though in many cases the crop may benefit from a dressing of this stimulant which not only improves tilth, but maintains rapid development of the plants, bringing them more quickly through the rooting stage. The chloride and sulphate of calcium are to be avoided at all costs, as even in moderate quantities they are very injurious. In almost all districts the natural soil content of phosphates and potash requires to be supplemented after the first crop by artificial supplies. The former should be supplied in the form of basic slag, or acid phosphate where transport is a consideration, rather than as bone phosphate which is less readily available. Since potash again can be used neither as the chloride nor sulphate for the reasons stated above, the only practical sources of supply are the carbonate and the nitrate, and as a matter of fact almost all of the proprietary tobacco fertilisers contain the latter salt as an essential constituent. A warning is necessary against the use of the commoner grades of commercial nitrate which frequently contains an injurious proportion of chlorides, and a guarantee should be secured that these do not exceed 2 per cent. of the total weight.

In view of the fact that a tobacco industry has been pioneered in the outlying districts of Natal at a distance from the railway, the question of carriage is an all important consideration, and a highly concentrated fertiliser desirable. A formula has consequently been compiled bearing a definite relation to this requirement and the character of our tobacco soils, the corresponding fertiliser containing six parts of high grade superphosphate, two parts of nitrate of potash and two of bone dust. This complete mineral manure can be supplied at the rate of £8 5s per ton plus freight to centre of distribution, and should be employed at the rate of 300 ℔s. per acre. The profitable employment of high priced fertilisers is an index to successful tobacco planting, and an expenditure of £20 per acre in this connection is not unusual in many of the tobacco districts of the United States, an adequate return being secured in the quality and weight of the resulting leaf. That the tobacco crop is a very exhausting one cannot be denied, and it has been shown that a harvest of 6,000 ℔s. removes from the soil 274 ℔s. nitrogen, 44 of phosphoric acid and 170 ℔s. of potash, while the residue, represented by stems and roots, contains 598 ℔s. of nitrogen, 184 ℔s. phosphoric acid, and 792 ℔s. of potash. The latter may, and should, be returned to the soil, but the demands of the leaves alone compel constant attention to the renovation of our tobacco lands if exhaustion is to be obviated, to which end a careful rotation of crops, a system of green manuring and suitable fertilisers must be regularly employed.

TRANSPLANTING.

The object of the tobacco planter should be to bring his crop to maturity within sixty to seventy days from transplanting. Such a result can only be secured when the ground has been brought to the best possible tilth by repeated ploughing and harrowing. Level cultivation is only admissible when there is no possible danger of water standing in the surface soil, and on all but thoroughly drained lands ridges should be thrown up by turning two shallow furrows together with a light orchard plough. This system further prevents the leaves from being damaged by splashing of mud during heavy rains and also furnishes a means of irrigating the crop. If desired, hills can be formed by cross-ridging at such distances as it is intended that the plants shall be spaced in the rows, after which the two front angles of the square are drawn into the middle and the top flattened with the hoe. The wider spacing given to the ordinary types of pipe tobacco lends to hilling the additional advantage of permitting cross cultivation with the horse hoe. Cigarette and cigar tobaccos should, however, be planted much closer together in the row, and though in a new locality the planter must determine the best distances by experiment, it may be generally stated that good results are to be secured rather by crowding the plants than by allowing them too much room. In America the use of the horse hoe is reflected in a universal spacing of three to three and a half feet for manufacturing types, which treatment could only lead in the cases of the finer cigar and cigarette leaf to the loss of their characteristic delicacy of texture. The majority of Cuban and Sumatran tobaccos are allowed not more than a foot or fourteen inches in the row, though some of the more vigorous varieties may receive a spacing of two feet. The Turkish plants are relatively small and should never be set too far apart. The following scale is based upon South African experience and will be applicable to nearly all districts in Natal:—

Connecticut, Brazilian, Honduras, Burley, Medley Prior, spaced 3 feet x 3 feet—4,840 plants per acre.

Cuban, Zimmer Spanish, Sumatra, Havana, spaced 3 feet x 2 feet—7,260 plants per acre.

Virginian, Hester, Goldfinder, Warne, spaced 3 feet x 2½ feet—5,808 plants per acre.

Turkish, spaced 1½ feet x 1½ feet—58,080 plants per acre.

The actual planting should be done during or after rain. If the day be cloudy the work may be commenced early, but if the morning be hot and dry, the planting should be left until the latter half of the afternoon, so as to give the seedlings an opportunity to recover and establish themselves during the coolness of the night. They are ready for removal to the plantation when their leaves have attained the size of a penny piece. Choice should be made of those showing broad short leaves, and all those with long narrow leaves should be discarded, as this feature is an early index to the type of foliage the adult plant will carry. Prior to transplanting thoroughly saturate the seed bed and loosen the seedlings with a garden fork. They may then be drawn without injury to the roots by taking the leaves between thumb and finger, and placed in a basket which should be kept covered with a wet cloth. In the field they should be taken in the left hand while a hole is made with one finger of the right hand in the centre of the hill or ridge. Avoid making too deep a hole, and see that the roots are neither crushed nor turned up, for in such case the plant may live but will never flourish. It is also important that the soil be brought well round the bottom of the root, for if hanging by the neck the plant will early die. If irrigation water be available, it can generally be profitably employed at this stage to give the crop an early start. After three or four days the surface should be lightly stirred round the young plants to break any crust which may have formed, and the tobacco fertiliser distributed by hand to each hill.

Transplanting machines are coming into general use where cultivation is organised upon an extensive scale. Among others the "Bemis Transplanter" opens a drill, places a small quantity of fertiliser with each plant, moistens it with a jet of water, and finally earths up the drill. The plants are inserted by two operators seated at the back of the machine close to ground level. The capacity of this very useful implement is some five acres in the day.

Annual Report of P.V. Surgeon.

THE following is the Annual Report of the Principal Veterinary Surgeon, submitted by him to the Minister of Agriculture:—

Hon. Minister of Agriculture,—

Sir,—I have the honour to present to you my yearly report for the period 1st July, 1906, to 30th June, 1907.

During the early part covered by the period of this report, work in connection with the Native Rebellion was still being carried out by my Department in connection with transport animals, and more particularly as regards the testing of animals for glanders.

With the discharge of the Militia transport wagons, a considerable amount of work in connection with the inspection of these oxen had to be undertaken; and, owing to the suspicion that many of these animals might possibly have come in contact with infected East Coast Fever veld, all cattle which had at this time been engaged on Militia transport work, and all animals which had been part of the loot stock, had to be traced up and quarantined. As these animals had been distributed all over the Colony, this necessitated a considerable amount of work.

With regard to those transport animals which had been taken into Zululand from Natal: These were not allowed to return until they had passed through a temperature camp on the borders of Natal. Such a precaution was, in our opinion, necessary, as there was a possibility of their having been in contact with infected veld in Zululand unknown to us. The wisdom of such a course was proved by the fact that some four or five animals were found to be infected with East Coast Fever, and in consequence the animals were not allowed to enter Natal, but were, I understand, taken over by the Government in Zululand.

It was anticipated, when military operations commenced in Zululand, that cattle engaged with transport there would probably become infected with East Coast Fever. Accordingly, from our knowledge of the probable distribution of the disease, my Department advised that all wagons possible be commandeered in Zululand and that those which had to be taken from Natal to make up the deficiency be purchased outright and not taken over with a guarantee that they would be paid for until such time as they returned to the owner's farm. If this had been carried out the payment for hire for a long period with the subsequent purchase of these oxen would have been avoided. It was further considered necessary by my Department that all areas in which military operations had been conducted both in Zululand and in parts of Natal adjacent to that Province should be placed in quarantine in order that we should have the power to refuse permission for any cattle to leave such areas until they had been subjected to such conditions as would ensure their freedom from infection. This was considered particularly necessary in that portion of Natal between the Umvoti and Tugela Rivers, for although at this time we had no reason to think that East Coast Fever existed there, yet with the movement of transport cattle which had taken place from Zululand it was considered advisable to take such precautions. As this quarantine was not imposed, all we could do was to inspect cattle prior to their being discharged from transport service, which, from an East Coast Fever point of view, is of very little value, but which imposed upon the Department a considerable amount of work.

STAFF.

The professional staff during the year was as follows:—S. T. Amos, M.R.C.V.S., Durban; G. S. Bruce, M.R.C.V.S., Dundee; A. J. Beckett, M.R.C.V.S., Vryheid; C. H. Cordy, M.R.C.V.S., Greytown; A. F. Harber, M.R.C.V.S., Maritzburg; F. Hutchinson, M.R.C.V.S., Newcastle; J. McNeill, M.R.C.V.S., Newcastle and Verulam; O. A. O'Neill, M.R.C.V.S., Ladysmith; W. M. Power, M.R.C.V.S., Maritzburg; C. M. Sharpe, M.R.C.V.S., Bulwer and Port Shepstone; Chas. Tyler, M.R.C.V.S., Port Shepstone and Vryheid; F. A. Verney, F.R.C.V.S., Mooi River; J. L. Webb, F.R.C.V.S., Ixopo and Ladysmith.

Mr. Beckett has been transferred from my Department to that of the Government Bacteriologist. Mr. O. A. O'Neill left the Department on the 16th October, 1906. Mr. J. Donaldson, M.R.C.V.S., was appointed to take Mr. O'Neill's place; and Mr. C. H. Strachan has been appointed to take the place of Mr. J. McNeill, whose period of service expires on the 7th July, 1907.

STOCK INSPECTORS.

The following changes have taken place in the Stock Inspectors' appointments:—

In Umvoti County one Stock Inspector has been appointed to take charge of the whole of Eastern Umvoti and Krantzkop districts, to reside at Greytown, in the place of two Stock Inspectors in the past. The Stock Inspectorship of the Magisterial Division of Umlazi was abolished, this district being added to that of Durban Borough.

I regret to have to record the injuries received by Mr. Robbins, late Stock Inspector for the Magisterial Divisions of Lower Tugela and Mapumulo, during the late rebellion, which necessitated his relinquishing the post of Stock Inspector.

RINDERPEST.

There have been no cases of this disease in the Colony during the period of this report.

SHEEP SCAB.

During the year under review outbreaks of scab occurred as follows:—

Newcastle, 10; Dundee, 6; Ladysmith, 37; Bergville, 12; Estcourt, 33; Weenen, 21; Western Umvoti, 10; Eastern Umvoti, 18; New Hanover, 4; Krantzkop, 6; Upper Umkomanzi, 2; Umgeni, 5; Lion's River, 12; Polela, 12; Underberg, 11; Ixopo, 3; Harding, 6; Utrecht, 7; Vryheid, 17; Ngotshe, 3; Paulpietersburg, 4; Melmoth, 2; Nqutu, 50.

For the year ending 30th June, 1907, the number of outbreaks totalled 291, as compared with 295 during the previous year; but in last year's return are included the 50 outbreaks in the Nqutu district of Zululand. These 50 cases shown do not represent 50 actual fresh outbreaks of the disease, but the outbreaks shown to exist amongst the sheep of the different native owners; and in many cases it happens that, owing to the overlapping in the grazing and the indifferent herding of the sheep, one actual outbreak is responsible for the infection of the sheep of many owners. The natives in this district have for some time past given a considerable amount of trouble with scab in their sheep, and during last year matters had to be allowed to take their course owing to the native rebellion which existed in this locality for several months. Since matters have been quiet, however, the Stock Inspector has endeavoured to take energetic measures to suppress these outbreaks of scab, but the difficulty experienced has been in arranging for the satisfactory dipping of the sheep of the several owners, as, of course, none of them possess dipping tanks. In many cases the Stock Inspector has himself been compelled to personally dip the sheep; and, of course, in all cases very little good is done unless the Inspector himself supervises the dipping. Latterly, owing to the presence of work in connection with East Coast Fever, all the time which it is desired should be given to this question of sheep scab could not be devoted to it.

The number of outbreaks of scab which have occurred in Northern Natal have again this year shown a marked decrease, notwithstanding the fact that Natal carries a very large number of sheep from the Orange River Colony during the winter months—when, as is generally known, this disease is more prone to make itself evident. As previously stated, this falling off in the number of outbreaks is undoubtedly due to the carrying out of proper scab regulations in the Orange River Colony which did not exist a few years ago, and when—as ample proof can be shown—flocks of sheep actually infected with scab were brought into Natal regularly in the autumn.

INTER-COLONIAL VETERINARY CONFERENCE.

In March last an Inter-Colonial Conference was held with reference to the movement of stock from one Colony to another, particularly in regard to the movement of sheep, and on this latter question the following resolutions were passed:—

1. "That all restrictions hitherto placed on the movement of sheep

and goats for the purpose of preventing the spread of East Coast Fever should be withdrawn."

2. "That mutual ports of entry for the introduction of small stock should be established and that the cost of establishment and maintenance of such mutual ports should be divided between the Colonies using such ports."

3. "That all sheep or goats travelling by road from one Colony to another, except those entering another Colony under special regulations for the purpose of summer or winter grazing, should be dipped at the port of entry and allowed to enter after being examined and passed as visibly free from disease by a competent officer on the condition that a second dipping be carried out within a period to be prescribed by the receiving Colony."

4. "That all sheep or goats exported from one Colony to another by rail should be certified to be clean by a Government Veterinary Surgeon or Inspector of Stock in the Colony from which they are exported, should be dipped once under the supervision of such Inspector, and should pass the port of entry within ten days of such dipping. At the port of entry the sheep or goats should be examined by the Inspecting Officer, who should allow them to proceed to their destination, if he finds them dipped, free from scab, and their certificate in order; and, on reaching the detraining station or on arrival at destination as the receiving Colony concerned may prescribe these sheep or goats should again be dipped under supervision within a period of not more than 16 days from the date of the first dipping. This resolution is not intended to affect any Colony through which sheep or goats may pass by rail in transit from one Colony to another."

5. "That sheep or goats intended for immediate slaughter purposes should be admitted by rail under the same conditions as others, except that they may be exempted from being dipped on arrival at their destination, provided they are accompanied by a declaration that they are intended for slaughter within 10 days of being admitted and provided that they be found plainly branded on the back with a distinctive brand to be hereafter decided upon."

6. "That sheep or goats certified by the owner to be intended for exhibition purposes and accompanied by a certificate of health signed by a Government Veterinary Surgeon or Stock Inspector, should be allowed to pass from one Colony to another by rail without dipping, provided they are declared as visibly clean by the Inspector at the port of entry, and provided a copy of the certificate is previously posted to the Agricultural Department of the receiving Colony."

7. "That well-bred sheep or goats intended for sale for stud purposes (the onus of proof of which intention shall rest with the consignor) should be allowed to enter another Colony by rail without being previously

dipped in the exporting Colony, provided they are accompanied by a certificate from a Government Veterinary Surgeon or Stock Inspector that all the sheep or goats on the farm from which the said stock have been taken have been free from scab for twelve months or longer."

8. "That thoroughbred sheep or goats from oversea, if passed as clean by a Veterinary Surgeon or Stock Inspector at the port of landing, should be allowed to proceed to another Colony without being dipped, provided that if any delay occurs in transit, the owner be furnished with a certificate from the Government Veterinary Surgeon or Stock Inspector that such sheep since landing have remained clean and have not, to the best of his knowledge, come in contact with any diseased sheep or premises."

9. "That exporting Colonies should bind themselves to receive back into their territory from the port of entry infected sheep or goats found travelling by road or by rail therefrom, without imposing any restrictions upon their re-introduction, if such a course be considered desirable by the authorities of the Colony to which the sheep are consigned."

10. "That for the dipping of sheep or goats at the various ports of entry a preparation of lime and sulphur be used. Such preparation to be approved by the Governments of the various Colonies."

11. "That this Conference is of opinion that the Governments of the various Colonies should combine in order that experiments may be conducted with a view to recommending one dip which shall be considered as an efficacious scab-destroying preparation and which shall embody preventive as well as curative properties."

These resolutions cover most of the ground required in connection with the movement of sheep from one Colony to another with every regard to the Colony receiving the sheep and with a view to making such necessary regulations as convenient and as practicable as possible to the sheep owners.

With the Cape Colony and the Transvaal I was able to arrange for sheep entering or leaving Natal for winter or summer grazing to do so without passing through a port of entry and without being dipped, provided they were accompanied by a certificate from the exporting Colony to the effect that they had been inspected by a Government Veterinary Surgeon or Stock Inspector within ten days of crossing the border and were free from scab. I regret to say, however, that we have been unable to come to the same arrangement with the Orange River Colony. At the Conference at Bloemfontein neither the Director of Agriculture nor the Chief Inspector of Scab was present, which is somewhat remarkable, as the Conference dealt in particular with the inter-colonial movement of sheep; and during my visit to Bloemfontein I was unable to get any definite statement that sheep would be permitted to enter the Orange River Colony from Natal for summer grazing on the lines above stated. I informed them that the Natal Government was prepared to accept their certificates and to dispense with the dipping on arrival at their destination if they would meet us in the same way, and that, further, the Natal Government was prepared, for the period during which sheep were returning to the Orange River Colony, to appoint temporary additional inspectors to ensure more thorough inspection and to avoid inconvenience to sheep owners. The Orange River Colony authorities have since intimated to us that they are not prepared to make a definite statement to the effect that sheep returning for summer grazing will be accepted on certificate only.

EAST COAST FEVER.

During the period of this report there have been outbreaks of this disease as follows:—Paulpietersburg, 25; Vryheid and Ngotshe, 68; Dundee and Umsinga, 27; Ladysmith, 5; Muden, 2; Umvoti, 3; Durban County, 27; Alexandra County, 1; Lower Tugela and Mapumulo, 30 (whole districts now considered infected); Zululand, 50 (whole districts of Nongoma and Mahlabatini now considered to be infected).

The disease was first known to exist in Natal proper in August of last year, and in my monthly report for August, appearing in the September issue of the *Agricultural Journal,* the whole position as regards the outbreaks in Durban County and in the district of Dundee is reviewed. During the whole year the position as regards this disease has been stated as fully as possible in each issue of the *Agricultural Journal,* and weekly returns giving the number of fresh outbreaks and the number of deaths have appeared in the local press.

As is generally known, when the disease invaded Natal proper and became more generally distributed (chiefly through the movement of stock which took place during the recent native rebellion), the policy of stamping out was urged upon the country, as it was recognised that, although up to that date we had been able to remove cattle from infected veld and its vicinity by means of temperature camps, yet with its appearance in the more populated districts of Natal this no longer became practicable, and it was urged that the only possible method of stamping out the disease was by the removal of the cattle from the infected and the adjacent veld for slaughter. However, as it is now to be regretted, this stamping out system was not adopted, but a policy of quarantine, fencing, and, later on, branding, was resorted to, and the disease continued to make progress in the infected and adjacent areas.

In my monthly report for November, which appeared in the December issue of the *Agricultural Journal,* the several methods of dealing with this disease were discussed at length. It is now the intention of the Government to ask for legislative powers to deal with East Coast Fever by the compulsory removal for slaughter of all cattle from infected and veld which is considered to be in-contact, and in addition to ask for a Compulsory Fencing Act in the sense known to us for dealing with East

Coast Fever. Should these powers be conferred upon the Government, and a sufficiently broad view be taken as to what must constitute in-contact cattle, we should see an improvement as regards the spread of East Coast Fever within a few months after such powers come into force.

In carrying out this stamping-out policy the most difficult part will be in determining (without removing many cattle unnecessarily) what cattle should be considered as in-contact. Such duties should only be entrusted to an experienced D.V. Surgeon, who not only has a knowledge of the district but who knows from experience what are most likely to be cattle running on possibly infected veld. In any case, in-contact cattle (if we are to hope to be as successful as possible in adopting this policy) must be decided upon by a responsible Government official who has no other interest in the district than his department. With the greatest of care there will, no doubt, be some cattle taken which might have been left, and some left which might have been taken, but our object must be to reduce such cases to a minimum.

The determining of in-contact cattle is often rendered more difficult in this country owing to the absolute lack of information as regards the movement of stock which may have taken place, and this applies in particular to the stock of natives. We know that even in districts where movement is prohibited and a large amount of money is expended on guards, quarantine officers, etc., movement can still be carried on by unscrupulous persons without being detected; and it is for this reason that, although we may apparently deal with all the in-contact cattle in connection with any particular outbreak, yet we are almost sure to find fresh outbreaks cropping up even after this stamping-out policy has been carried out for some little time. The advantage of having the power of stamping-out, however, lies in the fact that we can immediately dispose of such isolated outbreaks in many cases before there is any possibility of infected cattle having been removed.

The necessity for and the advantage of having a Compulsory Fencing Act to work with in connection with this compulsory slaughter of cattle, lies in the fact that in many cases we shall be able to avoid moving cattle from areas adjacent to infection by insisting upon such areas and farms being fenced to our satisfaction.

In deciding on in-contact cattle, existing fences will be considered as one of the chief recommendations in allowing cattle to remain, but it must be clearly understood that a fence is only of value in connection with East Coast Fever in so far as it stops the movement of cattle, and if any suspicious history of the movement of cattle has taken place adjacent to a fenced farm or fence area, then such cattle would probably have, in some cases, to be considered in-contact and have to be removed. It will be in such cases that the Department will be most severely criticised and that the owners will consider they have been most hardly dealt with, Apart from the fact that areas can be fenced, and the cattle in some cases allowed to remain thereon, a Compulsory Fencing Act is required to compel the fencing-in of areas even after the cattle have been removed; and this will be the most difficult part to enforce, as the owners of such farms will feel that they no longer have cattle to protect and, therefore, should not be called upon to fence their properties.

If the stamping-out process is to be a success, it will be apparent that it is just as necessary to take steps to prevent animals returning from or straying on to infected veld before it is clean as it is to remove animals from infected veld. I think there is no doubt it will be the removal of in-contact cattle that will be met with the greatest opposition, as the majority of people who have not actual infection among their cattle cannot be persuaded that their animals are probably in-contact and probably running on infected veld. If the stamping-out policy is to be a success, when cattle are impartially considered to be in-contact they must be removed, notwithstanding any political exigencies that may tend towards their non-removal.

Some few months ago many people in the Colony would not believe the existence of East Coast Fever or that it was any different to the ordinary redwater. We are glad to note now that this idea has fallen through, and the country now realises it is faced with a most serious disease, and one which, if not properly handled, will seriously affect the farming interests of this Colony for many years to come.

During the period covered by this report many alleged cures for the disease have been tried, all with the same result, viz., failure.

The movement of cattle in those districts which have been placed in quarantine, and in which movement is permitted, has been controlled by the permit system, which system has been found to work well and to cause the least amount of inconvenience to the public consistent with its proper carrying out. During the period of this report, 6,511 permits have been issued for the removal of slaughter cattle, representing 16,349 head of cattle; 550 permits have been issued for the movement of cattle from one district to another. All the above permits have been issued from my office.

The system of local committees in the several districts has been found to work most satisfactorily and it is a pleasure to record the support and advice which we have received from the gentlemen who have been good enough to act on these committees.

In those districts where movement is allowed on permit from local Permit Officers, the gentlemen who have acted as such have undoubtedly given up a very great amount of their time in the public's interest and in the welfare of their district.

The deaths from East Coast Fever during the period of this report were as follows:—Paulpietersburg, 565; Vryheid and Ngotshe, 600;

Dundee and Umsinga, 771; Ladysmith, 72; Muden, 114; Umvoti, 29; Durban County, 1,043; Alexandra County, 20; Lower Tugela and Mapumulo, 5,600; and Zululand, 7,545. These deaths in Vryheid, Ngotshe and Zululand are only approximate.

The number of cattle moved for slaughter from the several districts from the 15th September, 1906, to the 30th June, 1907, amounts to 16,349, made up as follows:—

From.	To.	No.
Vryheid ...	Durban ...	3,002
do ...	P.M.Burg ...	635
Utrecht ...	Durban ...	102
do ...	P.M.Burg ...	29
do ...	Newcastle ...	54
do ...	Vryheid ...	100
do ...	Johannesbnrg ...	50
New Hanover ...	P.M.Burg ...	176
do ...	Verulam ...	84
Dundee ...	Durban ...	2,512
do ...	P.M.Burg ...	175
Upper Umkomanzi...	Durban ...	136
do ...	P.M.Burg ...	62
do ...	Verulam ...	29
do ...	Camperdown ...	5
Lower Tugela ...	Durban ...	1,077
Estcourt ...	Durban ...	488
do ...	P.M.Burg ...	841
do ...	Verulam ...	259
do ...	Howick ...	60
do ...	Estcourt ...	6
Lions' River ...	Durban ...	259
do ...	P.M.Burg ...	867
do ...	Howick ...	140
do ...	New Hanover ...	27
do ...	Verulam ...	12
Klip River ...	Durban ...	161
do ...	P.M.Burg ...	436
do ...	Dundee ...	4
do ...	Howick ...	8

From.	To.	No.
Umgeni	Durban	26
do	P.M.Burg	658
do	Verulam	15
Ixopo	Durban	489
do	P.M.Burg	34
do	Umzinto	74
do	Verulam	183
do	Richmond	12
do	Nottingham Road	12
do	Creighton	1
Umvoti	Durban	591
do	P.M.Burg	482
do	Verulam	22
do	Greytown	9
do	Stanger	3
Mid Illovo	Durban	44
do	P.M.Burg	20
do	Richmond	4
Newcastle	Durban	42
do	Newcastle	30
do	Hatting Spruit	3
Inanda	Durban	11
Stanger	Johannesburg	392
do	Durban	70
Alexandra	North Shepstone	4
Umlazi	Durban	43
Umsinga	P.M.Burg	22
Alfred	Durban	59
Polela	Durban	156
do	P.M.Burg	152
do	Verulam	20
do	Richmond	6
do	Creighton	1

From.	To.	No.
Lower Umzimkulu...	Durban ...	164
do ...	Verulam ...	36
do ...	North Shepstone ...	4
Pondoland ...	Durban ...	24
Zululand ...	Durban ...	502
do ...	P.M.Burg ...	88
do ...	Eshowe ...	40
do ...	Stanger ...	5
	Total ...	16,349

Cattle from infected districts are in all cases conveyed direct by rail in sealed trucks to approved abattoirs. The animals are temperatured before they leave the place on which they are running, such temperaturing being maintained daily until they are entrained. No animal is permitted to be removed from where it is running, and is at once destroyed *en route* if it shows a rise of temperature of 102-5 or over. The temperatures are taken in the early morning.

The amount of work under this head falling on my Department in this connection alone will be realised from the number of cattle forwarded from the several infected districts.

On arrival at the abattoir the cattle are removed from the trucks after the seals have been broken by an officer of the Department, and the animals are slaughtered within four days of arrival. All approved slaughter houses must be so arranged as to permit the animals being taken direct from the trucks into kraals constructed of 7 feet galvanised iron. The trucks conveying these animals are disinfected, and no hides, etc., are allowed to leave the abattoir until they have been thoroughly disinfected or salted for a period of eight days. This conveyance of cattle from infected districts through clean districts to abattoirs has received a considerable amount of criticism from some sections of the public, and it is admitted that, until one makes himself acquainted with all the details in connection with this transporting of cattle, and the means by which East Coast Fever is spread, there would appear to be danger attached to it. The only danger, however, in our opinion, is the possibility of a train meeting with an accident and cattle being liberated from the over-turning of the trucks; but it is thought, through the enormous benefits accruing to the individual cattle-owners in the infected districts and to the Colony generally by the disposal of these cattle for slaughter, we are justified in taking such risk. It has been argued that infected ticks may leave the trucks *en route*, but it must be remembered that, to start with, cattle with normal temperatures only are forwarded. It might, of course, happen that where animals are two days *en route* they may travel one day with a temperature, but even so it is extremely doubtful whether animals in this early stage of the disease are capable of transmitting the infection to the tick; and even allowing of this possibility it is known in practice that ticks are not disposed to leave animals under such conditions as falling on the bottom of a railway truck (any one who cares can observe this by stabling an animal and watching how often the ticks fall off their host while under such conditions). Presuming infected ticks may drop off an animal on to the floor of a truck their chance of escape from the trucks is remote, as the openings which may exist along the floor of the trucks (the majority of the trucks have no openings) quickly become plugged up by manure, and the tick which is responsible for the spread of East Coast Fever when falling off its host in the natural state is not in such a condition as to be capable of travelling any distance at all. Apart from this, assuming that an infected tick may escape from a railway truck, it escapes on the permanent way between two fences. If we were to be debarred from taking any practical steps to lessen the loss from East Coast Fever by circumstances such as the possibility of infected ticks escaping from railway trucks, then I fear we should not be able to make any real headway against the spread of the disease, as persons in an infected district, with the only outlook of annhiliation, would probably be more disposed to seek illegal methods of removing their cattle.

(*To be continued.*)

The habit known as "wool-sucking" is a phase of perverted appetite in the lamb, and, when observed, should be checked, as it is very likely to prove fatal. The lamb begins by sucking the wool round the teat of its dam, and, as Veterinary-Colonel Nunn suggests, liking the saline taste, perseveres in the habit, even going so far as to eat the fleece of its companions. Lambs of about six weeks are more prone to the habit than younger or older animals, says the *Live Stock Journal,* and it is most common among those of the long-woolled breeds, Cotswolds or Merinos. The wool sucked or nibbled off forms into balls about as big as marbles when swallowed, and these balls block up the small bowel where it passes out of the fourth stomach. Even if the lamb does not die, the digestive arrangements are so disturbed that the animal loses condition, and remains small and stunted.

Tobacco Growing.

In his last issued report, Mr. Hannon, the Superintendent of Agricultural Co-operation at the Cape, states that the cultivation and treatment of the tobacco crop is peculiarly suitable to methods of combination for its successful management. The matter has been discussed in several districts of Cape Colony, and a good deal of interest has been aroused in flue drying, and generally the more efficient treatment of this valuable crop. It is absolutely necessary, Mr. Hannon points out, that some system of itinerant instruction in tobacco culture, and in the preparation of the leaf to suit the requirements of South African manufacturers, should be introduced, as at present there is no uniformity whatever observed in the different parts of the country in any branch of tobacco culture. The manufacturers consider that, with a little more care, the price of tobaccos for their purposes could be raised from 50 to 100 per cent., and the various experiments undertaken by the Cape Agricultural Assistant have clearly demonstrated the capability of the soil and climate of that Colony to produce a leaf of very high quality.

On the subject of the development of the tobacco industry, the following extracts from Mr. G. R. Freeman's report on the samples of tobacco forwarded to the South African Products Exhibition in London, should prove of interest to Natal readers:—

"I would strongly recommend the South African farmers to give the matter of tobacco culture (which includes all the other processes of curing and packing) a vast deal more care and attention in the future than they have done in the past. Judging from all the samples shown, the whole business is conducted in a most slipshod, haphazard fashion, whereas with care they should rival Sumatra, a Dutch Colony, where tobacco was grown for the first time only thirty years ago, and where some of the plantations pay annually 300 to 400 per cent. on their capital outlay. They have proved more profitable than most gold mines, and prices for good tobacco are ruling higher than ever this year.

"For the purpose of cigar-making there are three distinct classes of tobacco required, viz.: (1) Filler, or the broken leaves used in the interior of the cigar; (2) binder, or coarse leaf, used to hold filler roughly in shape in preparation for (3) the cover or wrapper, which is the only part seen by the purchaser.

"The filler should be a tobacco of about six to ten inches in length, not necessarily very sound or unbroken, containing not more than 16 per cent. of stalk, and must be of good quality. For this grade Havana tobacco is unrivalled, and fetches from 1s. 6d. to 3s. per ℔. exclusive of duty.

"The binder or bunch wrapper most used is a seed tobacco grown in the United States, or a somewhat similar tobacco grown in Germany. These are rough but sound tobaccos, mostly of excellent burning, and, except the German, of a neutral flavour. These tobaccos are usually sold without stalk (*i.e.*, stemmed), and realise from 1s. 3d. to 1s. 9d. per ℔.

"The cover leaf should be of a clean and silky texture, of a clear greyish and light brown colour, not marbled or double coloured. It must burn evenly and white, hold the fire and ash, and the flavour must be good or neutral. The covers most in vogue, and which largely fill above requirements, are Sumatra, Borneo, and Java, all East Indian tobaccos, but necessarily varying considerably in quality, quantity, and price. A good cover will fetch from 1s. 6d. to 10s. per ℔.

"It should be borne in mind that the tobaccos required for cigar, cigarette making, or pipe purposes, are all of them absolutely distinct. The atmospheric conditions, the soil, cultivation, or treatment, are for each class quite different, and require the services of special experts to advise and superintend. Such experts can only be obtained by payments of high salaries, but the expense could be divided between a district or Colony and services charged *pro rata.*

"At any rate, if tobacco is to be grown successfully, the rough-and-tumble methods of 200 years ago must be abandoned, and the up-to-date and scientific cultivation of successful competitors be copied.

"I feel confident that any care spent on cultivation will be more than repaid, and that, should South Africa succeed (and there is every reason to believe she can do so) in producing tobaccos to fill any of the above requirements, I am convinced that my manufacturers here will gladly welcome such, and give their fellow-countrymen a full share of the profit of this cultivation, which is now all practically absorbed by the foreigner."

Some say it is bacteria
  That makes our milk test bad,
And that we must make war on them
  So buyers won't get mad.
But I contend for cleanliness
  In words both strong and curt,
For everything that gets in milk
  Is just plain dirt.

M. G. K. in the *American Agriculturist.*

Agricultural Acts, Session 1907.

The following are the main provisions of the Acts affecting agriculture passed by Parliament during the Session just concluded:—

ACT No. 6. 1907.

"To provide for the compulsory fencing of lands within the Colony of Natal" (the East Coast Fever Fencing Act, 1907).

2. (*a*) For the purpose of preventing the spread of the cattle disease known as East Coast Fever, and notwithstanding anything contained in the Fencing Law, 1887, or the Laws and Acts amending the same, the Minister of Agriculture may, with the approval of the Governor in Council, cause to be erected fences along the boundaries of any farms within an infected or suspected area or of any native location or of any town lands within such area. (*b*) The term "fence" in this Act shall mean a fence approved by the Minister of Agriculture.

3. (1) The cost of erecting any fence along the boundaries of any farm shall be in the first instance defrayed out of moneys voted by Parliament. Such cost shall be repaid, together with interest thereon at the rate of five per centum per annum, by thirteen yearly instalments, the first payable two years after the fence is completed. Such instalments shall be calculated and fixed so that the said cost with interest thereon shall be wholly repaid within a period of thirteen years from the date on which the first instalment falls due. (2) Such repayments of cost and interest shall be made by the owner of any farm fenced under the last preceding section or if the fence divides the farms of adjoining owners then each such owner shall pay one-half the cost of the part of the fence dividing such farms together with the interest aforesaid. (3) The term "owner" in this and the following sections shall mean the person registered as the owner in the office of the Registrar of Deeds, and the term "farm" shall include any portion of a farm. (4) Should any farm or area be bounded by any river bank, donga or spruit, the Minister of Agriculture shall have the power to erect the fence along some more convenient line. In such event the cost of the fence shall be borne solely by Government, who shall have the right to dispose of or remove the same when desirable. (5) Where the adjoining land is Crown land or held by the Natal Native Trust, the Government, or the Natal Native Trust, as the case may be, shall bear one-half of the cost of the fence.

4. The Minister of Agriculture shall notify in writing to the Registrar of Deeds the amount due by any owner under this Act, and the Registrar of Deeds shall upon receipt of such notification note the said

amount in the Land Register and shall deliver to the Minister of Agriculture a certificate setting forth such amount and the date of the note. The cost of such fencing shall be a first charge and lien in favour of the Government upon the land so fenced, and such lien shall have priority over any existing mortgage thereon. An entry shall be made by the Registrar of deeds in the Public Debt Register of the particulars of such debt due to the Government, and of the lien upon the land.

5. Where any such farm aforesaid held under lease has been enclosed by a fence erected under this Act during the term of the lease, the lessors shall be entitled to receive from the lessee as from date when such farm became so enclosed a payment of five per cent. per annum on any sum he may have paid to the Minister of Agriculture under Section 3, and such payment shall be made with the rent of the farm and shall be deemed in law to be part of such rent.

6. Whenever the Minister of Agriculture shall have incurred any cost in respect of the fencing under this Act in respect of any town lands which may have become vested in the Corporation of any Borough or the Local Board of any Township, the cost shall be repayable by such Corporation or Local Board in the manner provided by Sub-section 1 of Section 3 of this Act.

7. Nothing in the foregoing sections shall be deemed to prevent any person liable for the cost of the erection of a fence under this Act from contributing approved material or labour or transport towards the cost of such fence, and any such contribution shall be set off against the amounts mentioned in the said sections respectively according to a value to be determined in the absence of agreement by the Magistrate of the district.

8. The Minister of Agriculture may cause to be fenced (1) Any roads, whether public or private, traversing any part of the Colony; (2) Any boundaries of the Colony or outspan in the Colony; and the cost of any fence erected under the powers of this section may be defrayed entirely out of the moneys voted by Parliament for the purposes of this Act.

9. This Act shall be read and construed in conjunction with the provisions of the Fencing Law of 1887 and the amending Acts so far as the same may be applicable thereto; and the Minister of Agriculture shall have power to direct owners to properly maintain and keep in good repair any fences; and, failing their compliance, he may carry out such repair at the owner's cost, subject to the provisions of Section 3 of this Act. No person shall remove or in any way interfere with any fence erected or maintained under authority of this Act.

10. The Governor in Council may from time to time make regulations, and any person who shall contravene such shall, upon conviction in the Court of a Magistrate, be liable to a fine not exceeding Ten Pounds (£10), or in default to imprisonment with or without hard labour for a period not exceeding one month.

11. Any person who shall contravene Section 9 of this Act shall, upon conviction in the Court of a Magistrate, be liable to a fine not exceeding Twenty-five Pounds (£25), or to imprisonment with or without hard labour for any period not exceeding six months.

ACT No. 7, 1907.

"To amend Act No. 53, 1906, entituled Act 'To authorise the Governor to borrow the sum of £100,000 from the Consolidated Loans Fund, to be used for the prevention or suppression of the disease known as East Coast Fever."

1. Section 3 of the Act No. 53, 1906, is hereby repealed, and the following substituted therefor:—

The purposes to which this Act applies are as follows:—

(1) Loans to owners of cattle or others who are in need of such assistance for fencing their lands, for purchase of transport animals or otherwise for the prevention or suppression of the disease known as East Coast Fever.

(2) The purchase by the Government of such donkeys, mules, horses, wagons or gear as may be necessary for the establishment of a transport service in any district in which the movement of oxen may be prohibited under the provisions of the East Coast Fever Act, No. 32, 1903, and all amending Acts which are now in force and any regulations made thereunder.

ACT No. 8, 1907.

"To amend Act No. 32, 1903, entituled Act 'For preventing the spread of the disease known as Rhodesian Redwater.'"

1. The following clause shall be added to Act No. 32, 1903:—

The Minister may at any time when he considers it necessary to do so in order to prevent the spread of the disease, order the removal of cattle from an infected area or from any place adjacent to an infected area, and dispose of them for immediate slaughter: Provided, however, that the owner of any such cattle shall have the alternative of disposing of the whole of the same by private treaty, for slaughter, within one week after notice has been given him in writing. If the owner shall so dispose of such cattle he must conform to all Government requirements, and all rules and regulations which may be in force regarding the removal of cattle. Cattle so taken shall be paid for at the rates specified in the Schedule to this Act.

2. The Schedule to Act No. 54 of 1906 is hereby repealed, and the following Schedule enacted in lieu thereof, namely:—

SCHEDULE.

	£	s.	d.
Yearling oxen or bulls, up to	2	0	0
Yearling heifers, up to	3	0	0
2 year old oxen or bulls, up to	3	0	0
2 year old heifers, up to	4	0	0
3 year old oxen or bulls, up to	4	0	0
3 year old heifers, up to	5	0	0
Cows, 4-8 years, with calves, up to	7	10	0
Cows, 4-8 years, without calves, up to	6	10	0
Oxen, over 4 years, up to	7	0	0
Cows, 8-12 years, with calves, up to	6	0	0
Cows, 8-12 years, without calves, up to	5	0	0
Old cows, with calves, up to	4	0	0
Old cows, without calves, up to	3	0	0
Bulls, 4 years and over, up to	4	0	0

ACT No. 14, 1907.

"To amend Act No. 27, 1899, entituled 'Act to provide for the inspection and examination of cattle arriving in this Colony by sea, and to prevent the introduction of the disease of tuberculosis.'"

1. This Act shall be read and construed together with Act No. 27, 1899, hereinafter called the principal Act.

2. The words "or land" shall be inserted after the words "by sea" in the second section of the principal Act.

3. Sections 4, 5, and 6 of the Principal Act are hereby repealed, and the following substituted therefor:—

> All cattle imported into Natal by sea save those accompanied by certificates given by qualified Veterinary Officers approved of by the Minister of Agriculture, shall upon their arrival be quarantined until tested by the Examiner with tuberculin, and shall not be released from such quarantine until the Examiner certifies them to be free from any reaction indicating their being infected with tuberculosis in the form of the schedule to this Act.
>
> Cattle imported into Natal over any inland border, may, at the discretion of the Minister of Agriculture, be required to be placed in quarantine at the place of entry, or upon their arrival at their destination, and there be tested with tuberculin by an officer of the Veterinary Department, and shall not be released from such quarantine until they are certified by such officer to be free from any reaction indicating their being infected with tuberculosis in the form of the schedule to this Act.

4. Section 7 of the principal Act is hereby repealed, and the following substituted therefor:—

> In the event of any such animal proving to be affected with the disease of tuberculosis it shall not be removed alive from the quarantine station, but shall be destroyed there: Provided that the owner may in cases of animals imported by sea have the option of returning or re-shipping the animal, in which case it shall be taken direct from the quarantine station to the vessel.

5. The words "or land" shall be inserted after the words "by sea" in Section 12 of the principal Act.

6. Any cattle which may have been allowed to land under the 13th Section of the principal Act, shall be inspected and branded with a suitable brand decided upon by the Principal Veterinary Surgeon, and shall be slaughtered within a period of one calendar month from the date of landing in the Colony.

In the case of cattle so imported coming from countries where tuberculosis is known to exist such cattle shall be quarantined until slaughter and their carcases or any part thereof shall not be removed until they have been passed, as fit for human consumption, by a Government Veterinary Surgeon.

If any such cattle are not slaughtered within one month, or within such longer period as may be granted by the Principal Veterinary Surgeon, the owner shall be liable in respect of each animal to a penalty as provided in Section 12 of the principal Act.

ACT No. 15, 1907.

"To amend the Lungsickness Prevention Act of 1897."

1. The word "owner" as used in the Lungsickness Prevention Act of 1897 (hereinafter called the principal Act) shall include a partnership, company, or corporation.

2. The word "lungsickness" shall mean the disease known as contagious pleuro-pneumonia in animals of the ox tribe.

Section 3 of the principal Act is amended accordingly.

3. The appointment of inspectors of cattle shall be made by the Minister of Agriculture and not by the Governor in Council or by the Governor, as provided under Sections 5 and 6 of the principal Act.

4. Section 8 of the principal Act is hereby repealed, and the following is enacted in lieu thereof:—

In the event of any herd being declared by a Government Veterinary Surgeon or such Inspector to be infected with the disease of lungsickness, the owner of such herd shall be granted a license, conforming as near as may be to the form of license set forth in Schedule B, to keep such cattle for a period of three months for the purpose of drenching or inoculating the herd and at once destroying any animal which a Government Veterinary Surgeon or Inspector declares to be showing symptoms of lungsickness. Every such license shall contain a condition that the cattle thereby licensed shall, at the owner's option, be at once drenched or inoculated to the satisfaction of the Inspector, and that all animals showing symptoms of the disease shall be immediately destroyed. At the expiry of such license the Government Veterinary Surgeon or Inspector shall reinspect such herd, and should there have been a case of lungsickness in such herd within the period of the license, the license shall be renewed for a further period of three months, dating from such last appearance, and such inspection shall be renewed every three months until such herd is found free from the disease. No cattle shall be allowed to be removed from the land on which they are licensed until the Government Veterinary Surgeon or Inspector shall declare the herd clean, under a penalty not exceeding Twenty-five Pounds Sterling, or, in default of payment thereof, to imprisonment not exceeding three months.

5. The notice required to be given by the owner under Section 9 of the principal Act shall be to the District Veterinary Surgeon or the Inspector, and not to the Magistrate as provided under the said section.

6. In the event of an animal being destroyed by the order of a Government Veterinary Surgeon or Inspector under the provisions of Section 4 of this Act, compensation shall be payable to the owner of such animal at the rates set forth in the Schedule A of this Act: Provided that in the case of the owner being guilty of any neglect in failing to report or of any undue delay in reporting an outbreak, no such compensation shall be payable.

7. Section 10 of the principal Act is hereby repealed, and the following is enacted in lieu thereof:—

All cattle so licensed shall be isolated by herding, or otherwise, at a distance not less than ten yards from the boundary of the property on which they are licensed, and from any public road.

For every breach of this provision the owner shall be liable, upon conviction in the Court of a Magistrate, to a fine not exceeding Thirty Pounds Sterling, or, in default of payment, to imprisonment with or without hard labour for any term not exceeding six months:

Provided that should it be proved to the satisfaction of the Government Veterinary Surgeon or Inspector in the case where a farm is intersected by a public road or roads, that it is absolutely necessary for licensed cattle to cross or be driven along such road or roads on such farm the Inspector is empowered to allow such removal under the restrictions contained in Section 13 of the principal Act.

8. Schedule B of the principal Act is hereby repealed, and the following is enacted in lieu thereof:—

SCHEDULE B.

I certify that a herd of (state number) . . . . cattle belonging to . . . . on the farm . . . . in Ward . . . . County of . . . . are infected with lungsickness, and I hereby grant to the said . . . . license to keep the same for three months from date, for the purpose of complying with the conditions of Sections 8, 9, and 10 of Act No. 30, 1897, as amended by Act No. . . . . . ., 1907, as endorsed hereon.

Dated at . . . . this . . . . day of . . . . 19. . . .

. . . .

Inspector.

SCHEDULE A.

	£	s.	d.
Yearling oxen, up to	2	0	0
Yearling heifers, up to	3	0	0
2 year old oxen, up to	3	0	0
2 year old heifers, up to	4	0	0
3 year old oxen, up to	4	0	0
3 year old heifers, up to	5	0	0
Cows, 4-8 years, with calves, up to	7	10	0
Cows, 4-8 years, without calves, up to	6	10	0
Oxen, over 4 years, up to	7	0	0
Cows, 8-12 years, with calves, up to	6	0	0
Old cows, with calves, up to	5	0	0
Old cows, without calves, up to	4	0	0
Bulls, under 4 years, up to	3	0	0
Bulls, over 4 years, up to	4	0	0

ACT No. 28, 1907.

"To amend Act No. 44, 1904, entituled Act 'To aid and encourage the agricultural development of Natal.'"

1. Section 12 of the Agricultural Development Act No. 44, 1904, hereinafter called the principal Act, is hereby repealed.

2. The following clause shall be added to Section 34 of the principal Act:—

> An allottee shall be entitled, on satisfying the Board that he has beneficially occupied the block held by him for a period of fifteen consecutive years, to a grant in freehold of the block so occupied, on such terms as to payment of purchase price as the Governor in Council may decide on the advice of the Land Board.

3. The following clause shall be added to Section 36 of the principal Act:—

The allottee shall be entitled, on satisfying the Board that he has beneficially occupied the block held by him for a period of fifteen consecutive years, to a grant in freehold of the block so occupied, on such terms as to payment as the Governor in Council may decide on the advice of the Land Board.

ACT No. 29, 1907.

"To prohibit the Export of Ostriches and Ostrich Eggs."

2. It shall not be lawful to export any ostrich or ostrich egg, except as hereinafter provided, to any place beyond the limits of this Colony, or to any country separated therefrom by sea: Provided, however, that this prohibition shall not apply to the export of any ostrich or ostrich egg to any neighbouring Colony or State which shall, by its own Legislature, have similarly prohibited the exportation of ostriches and ostrich eggs, subject to the aforesaid exemption, to any neighbouring Colony or State, and under a penalty not less than that provided for by this Act: And provided also that nothing in this Act shall prevent the export of the shells of ostrich eggs the contents of which have been removed, or of ostrich eggs which have been rendered unfertile, provided that in the latter case a permit to export shall have been obtained from the officer appointed by the Government for that pupose.

3. Every person who shall contravene the provisions of this Act by exporting any ostrich or ostrich egg (except as hereinbefore excepted), shall on conviction be liable to imprisonment with or without hard labour for any term not less than twelve months nor more than two years.

4. All penalties under this Act may be enforced in the Court of the Magistrate of the Division in which the offence was committed.

"Success don't consist," says a Yankee sage, "in never making blunders, but in never making the same ones twice."

Moving parts on new machinery frequently run hard on account of paint in the bearings. This paint can be easily removed by the use of paraffin, or one-half paraffin and one-half machine oil mixed. New machines should be carefully examined every day, as bolts often work loose or boxes may fit too tightly, causing them to heat.

Cape Wool Export.

THERE are twenty-one Wool Associations now in existence in the Cape Colony which have agreed to adopt the regulations laid down by the Executive of the National Association of Wool and Mohair Growers and which have endeavoured to carry out during the past season the methods of improvement approved of by that body. They are:—

Barkly East Co-operative Wool-growers' Association.
Bedford Co-operative Wool-growers' Association.
Beaufort West Co-operative Wool-growers' Association.
Burghersdorp Co-operative Wool-growers' Association.
Calvinia Co-operative Wool-growers' Association.
Cradock Co-operative Wool-growers' Association.
Caledon Co-operative Wool-growers' Association.
George Co-operative Wool-growers' Association.
Graaff-Reinet Co-operative Wool-growers' Association.
Griqualand West Co-operative Wool-growers' Association. (Kimberley).
Griqualand East Co-operative Wool-growers' Association. (Kokstad).
Hay Co-operative Wool-growers' Association (Postmasburg).
Hope Town Co-operative Wool-growers' Association.
Hanover Co-operative Wool-growers' Association.
Highlands Co-operative Wool-growers' Association (Albany).
Komgha Co-operative Wool-growers' Association.
Kolberg Co-operative Wool-growers' Association.
Sterkstroom Co-operative Wool-growers' Association.
Uniondale Co-operative Wool-growers' Association.
Vryburg Co-operative Wool-growers' Association.
De Aar Co-operative Wool-growers' Association.

Mr. Hannon, the Cape Superintendent of Agricultural Co-operation, in his last report, says that in his tours during the year the subject was constantly discussed, and that there was a universal desire on the part of farmers to improve the "get up" of their clips.

The Trades Commissioner for the Cape in London has been in consultation with the leading members of the London Wool Exchange on the subject of the organised attempts at improvement now being made at the instance of the Government, and has furnished the following statement to his Government:—

"I have made careful inquiries amongst the leading wool-brokers and wool buyers in London as to the question of Cape wools, and I am now prepared to deal only with the question of the effects of the recent improvements in the getting-up and classification of the wools and also the question of a National Brand. . . .

"The general opinion of the brokers and dealers is that there has been considerable improvement in this direction, and that all such improvements are much appreciated by the buyers, though there is still much room for further improvement, which can only be effected by continuously obtaining the opinions of the actual buyers on the large markets, who are the manufacturers of woollen goods, and to bring such information forcibly before the actual producer.

"After going carefully into the matter I find that the person most interested in the quality of the wool on the markets is the man who uses it for manufacturing purposes. He, of course, only pays for it in proportion to the percentage of good quality wool in every bale. On the other hand, the person who can benefit most by the improvement of his methods of get-up and classification is the person producing the wool. The difference between the prices of wools badly got up and well got up is astonishing. I am much struck by the fact that there is a wide gulf between the consumer and the producer.

"My object, therefore, is to bring about a closer line of communication between these parties for the purposes only of conveying clearly to the one the exact wants of the other, so as to enable the producer to carry out the wants of the consumer. It must be clearly understood here, that I am not now alluding in any way to the financial or economic question of collection and distribution, nor do I wish to interfere in any way with the channels through which Cape wools find their way into the hands of the manufacturers.

NATIONAL BRAND OR TRADE MARK.

"The general opinion of wool brokers is that the Brand will, after it has become known, have a good effect upon the market and be advantageous to the associations adopting it, provided, however, that the greatest care is exercised in the classification of the wool sold under this brand, and that a uniformity of the classification is sustained. It must further be remembered that at all public sales the wools are sold almost entirely on their merits and are open for inspection, and that little notice is therefore taken of brands, though good brands are looked for in succeeding years' sales and keenly bid for, but I am informed that the larger portion of Cape wools is sold by samples by private treaty to the manufacturers, and that in these cases a well-known and respected brand would be bound to find a better market.

"To have the National Brand of the Co-operative Associations protected it will be necessary to have same registered as a Registered Trade Mark in Great Britain, as well as in the Cape Colony.

"The question of Trade Marks is not an easy one to decide. Messrs. Findlay, Durham & Brodie, of 110, Cannon Street, E.C., write me as follows:—

"'If you had for some time past been using a particular Trade Mark in this country, and found it being used by others you would have a certain right of user which would enable you to prosecute with some chance of success. But the simplest thing to do would be to register in this country. If the mark now being used in the Cape Colony is an infringement of some mark already in use here, it would be a simple matter to make some addition or alteration to it and register afresh in both countries.'

"They further state that during the last season there has been a very considerable improvement in the get-up of certain Cape clips of wool, and there is no doubt that this improvement has had a favourable effect on prices.

"Messrs. Helmuth, Schwarz & Co., wool brokers, of 3 and 4, Moorgate Street, E.C., write to the same effect. They say:—

"'There is no doubt that a great improvement has been effected in the getting up and classifying of the wools under the control of the Associations, and we trust that this improvement will make further progress.'

"Messrs. Henry P. Hughes & Sons, wool brokers, of 10, Basinghall Street, E.C., say:—

"'It is high time that steps were taken towards the improvement (especially in the get-up) of Cape clips of wool, and it is very pleasant to be able to state that already in many cases, better prices have resulted. Many clips, however, still show a lamentable want of care, and so sell far cheaper than they would do if properly got up. The proposed introduction, therefore, of a National Brand, "Good Hope" in a crescent, is clearly a step in the right direction. If care is taken to grant it to lots which really are properly classed and skirted, a long-felt want will be met and much good will result. If, on the other hand, the privilege which it is meant (and ought) to ensure is too readily granted; in other words, if any laxity is shown in allowing this brand to be used it will speedily become a meaningless and worthless mark. We hope you will make this very plain, for it is a point on which buyers will undoubtedly have a good deal to say, and it is a matter of vital importance to the growers of the wool.'

"Messrs. Thomas & Cook, wool brokers, of 73, Basinghall Street, E.C., say:—

"'We are very pleased to note that an effort has been made to more carefully class and skirt wool clips from the Colony. We are very strongly of opinion that as a whole this will be very greatly to the advantage of the growers, if the classing does not necessitate making too many of the very small lots of each quality. A large grower might pack his hoggets, ewes, and wethers separately, and even select, and pack the best of these for lengths, etc., separately from the others, and also keep his pieces, bellies and locks, but packing these together as skirts. Speaking from 50 years' experience of selling wool in the London market, we are convinced that small lots do not as a rule sell as well as large ones, and this is why we suggest that in small clips, the classing would not be carried to the extent of making a number of very small lots.'

"Messrs. Willans & Overburg, wool brokers, of 7, 9, and 11, Moorgate Street, E.C., say:—

" 'There can be little doubt that the efforts of the Association referred to in the letter of the Superintendent of Agricultural Co-operation, Capetown, have resulted in a general improvement in the classing and get-up of the wool from South Africa. No doubt the introduction of a National Brand which in time would be recognised as a guarantee of regularity in classing and careful skirting, would be of considerable help to the trade and assist in improving the get-up of the wool, but it appears to us to be a difficult matter to prevent unscrupulous persons from using a similar brand and thus benefiting themselves at the cost of those who are entitled to the advantage. Uniformity in length of staple, regularity in condition and colour and careful skirting are the most important points in connection with wool in the grease. We shall be happy to provide you with any further information you may require, but the Superintendent, Mr. P. J. Hannon, appears to have a thorough knowledge of what is required—the difficulty, of course, being to persuade the owners that the better the wool is got up, the more profitable the returns.'

"Messrs. Chas. Balme & Co., brokers, 61, Basinghall Street, E.C., report (at the conclusion of the previous wool sales) :—

" 'A few lots of new clip greasy wools from the Western Province, which had been specially classed and skirted in accordance with advice given by the Government Expert were offered during the series. These clips, which were in exceptionally light condition, attracted unusually keen competition, and sold at prices ranging from 1s. to 1s. 1½d. per ℔., figures which fully demonstrate the advantages accruing to growers from efficiently classing and skirting their wools. It is to be hoped that flock owners in other parts of the South African Colonies, who have not hitherto troubled themselves to class and skirt, will also be induced by the Government officials to take greater pains in preparing their wools for market, and that if nothing else is attempted, they will at least remove dung-lumps and heavy skirts from the fleeces before they are packed.' "

STATISTICS.

Mr. Hannon publishes in his report the following statistics of supply, consumption and prices of wool, which should prove interesting to pastoral farmers in this Colony:—

	Highest Point.		Lowest Point.		Mean Point.	1906.
	Year.	d.	Year.	d.	d.	d.
Australian, good average, greasy ...	1899	15½	1895	7½	11½	13½
,, Sydney, greasy	,,	13	,,	6	9½	11
,, Adelaide, greasy	,,	11	,,	5	8	9¼
,, N.Z., greasy	,,	15	,,	7½	11¼	13½
,, Crossbred, greasy... ...	,,	16½	1901	9	12¾	16½
Cape, Eastern, fleece	,,	14	1895	6½	10¼	10½
Argentine, greasy (36 per cent. yield) ...	,,	9½	,,	4⅜	7	8¼
Mohair, Turkish	1895	32	1892	12	22	16½

The total annual value of Colonial supplies of wools, in 1895, 1899, 1903 and 1906, has been:—

Year.	Australian Bales	Cape Bales.	Average Value per Bale.	Total Value.
			£	£
1895	2,001,000	269,000	11	24,970,000
1899	1,641,000	267,000	14½	27,666,000
1903	1,451,000	234,000	13½	22,747,000
1906	1,833,000	238,000	17	35,207,000

It will be seen that the value per bale is the highest on record for last year, and the total value is also the record figure in the annals of the world's wool markets.

Dealing specially with Cape wools, the imports into Great Britain direct in 1906 amounted to 191,536 bales, with 37,774 shipped to the Continent, against 190,581 and 28,706 in 1905 respectively.

The disposal of Cape wools shipped to England stood thus from the 21st November, 1905, to the 19th November, 1906:—

	Bales.	Bales.
Into England, for sales		195,960
For London sales	36,000	
Forwarded to Interior	34,500	
„ Continent	125,400	
„ America	100	
Into Continent direct		42,463
„ America „		...
Total ...		238,423

This output was divided thus:—

Western Province	20,336
Eastern Province	174,781
Natal and Interior	43,306

Prices during 1906:—

	Jan. *d*	Mar. *d*	May *d*	July *d*	Sept. *d*	Dec. *d*
Fleece, superior Western ...	14	14	14½	14½	14½	14½
„ average Eastern ...	10¼	10¼	10½	10	10	10½
Grease, Cape	10¾	11¼	12	11	10½	11

Imports of mohair into England:—

	1906 lbs.	1905 lbs.	1904 lbs.
Turkey, etc.	10,500,000	12,500,000	10,800,000
Cape	14,600,000	12,500,000	14,000,000

The Consul-General for Portugal at Johannesburg has intimated to the Transvaal Government that land can no longer be granted to foreign settlers on the Huilla Plateau in the Province of Angola, Portuguese West Africa, as all vacant property there is now reserved for Portuguese subjects.

The Government of Western Australia has decided to offer the sum of £100 for an efficient stone and stump gathering machine; and a public trial of the competing machines is to take place in February, 1908. The winning machine will be required to remove or gather into convenient rows all stones and stumps of not less tan 4 inches across their longest axis and not exceeding 56 lbs. in weight.

The Land Board.

MONTHLY MEETING.

On the 25th and 26th September the usual monthly meeting was held in Maritzburg. Mr. Leonard Acutt, one of the original members, was elected Chairman for the ensuing year. Owing to illness, Mr. E. T. Mullens was prevented from being present.

In view of the large number of applications which have been received for land, it was decided at the previous meeting of the Board that further applications for land, other than at Winterton, Winkel Spruit, on the Oribi Flats, in the vicinity of the Umtamvuna, and in Zululand, should not, for the time being, be entertained; consequently only eight applicants appeared before the Board in support of their applications. A number of other applicants who had previously appeared before the Board were finally passed on the production of satisfactory evidence in respect to their capital and stock.

An interesting report was laid before the Board by the Superintendent of Settlements, from which it appeared that upwards of 600 acres of lucerne are under cultivation at the Weenen Irrigation Settlement, together with some 350 acres of forage. A large number of vines and fruit trees have also been planted, in addition to crops of wheat, barley, peas, onions, and mealies. The report shows that the estimated value of the standing crops amounts to over £9,000. There is every reason to believe that there is a great future for lucerne, which grows extremely well in the Settlement.

On Thursday night, 26th September, the Board left Maritzburg and journeyed by rail to Kwambonambi, which is situated in the Lower Umfolosi Division of Zululand, and which was reached at sundown on the following day. At Empangeni Station the Board was met by Mr. A. R. Turnbull, the local Magistrate, who introduced Mr. G. W. Higgs, who had been engaged to act as guide during the tour.

On Saturday, the 28th, the Board left Kwambonambi at 6 a.m., and travelled by mule wagon through the lands lying to the west of the railway as far as the Isitesa Lake. From that point it proceeded some five miles on foot to the north side of the Umfolosi River, inspecting the lands *en route*. It did not return to camp until five in the evening. At 6.30 the following morning the Board commenced its inspection of the lands lying north of the Mangu Bush and between the railway and Reserve No. IV.

On Monday, the 30th, the Board joined the train from Somkele and detrained at Empangeni, from which station it set out for the Umzingazi Lake for the purpose of inspecting the lands overlooking the lake. A halt for lunch was made on the borders of the lake lying within Reserve No. VI., but, as it was found impossible to reach the north end of the lake, a wide detour had to be made. On reaching a ravine which was impassable to vehicular transport, the Board was compelled to leave the mule wagon and travel some distance on foot. The Board eventually returned to Empangeni at 7.30 in the evening.

Owing to there being only a tri-weekly railway service between Empangeni and Ginginhlovu, the Board had to remain over Tuesday, which was devoted to inspecting the sugar cane on the farms of Mr. C. B. Addison and others in the immediate vicinity of the station, and, later in the day, the block of land between the Magistracy and Reserve No. V. The Board has, therefore, made an inspection of practically all the land available for settlement between the Umhlatuzi and the Umfolosi Rivers.

We understand the Board has reported that there is a block of from 15,000 to 20,000 acres of land south of the Umfolosi, lying east and west of the railway, which is eminently suited to the cultivation of sugar cane. There is, in addition, on the west side, high-lying ground which would make excellent homestead sites. Orchards could be advantageously laid off on the northern (across the river), western, and southern boundaries of the sugar land. The magnificent fresh water lake of Isitesa, and the Umfolosi River may possible prove an attraction in the future.

The remainder of the lands lying south and east of the line, as far south as Empangeni, is suitable for grazing purposes. Cattle, native sheep, and goats are doing well on the lands. Persian sheep might also thrive well.

On the Umhlatuzi lands which were recently thrown open for allotment the Board found sugar cane of only one year's growth looking as well as any on the finest land in Natal, and the Coast members of the Board agreed that they had never seen better canes for their age. The Board considers that the planters in this district have every chance of success.

Prior to the departure of the train on Wednesday morning, the Board visited the Government Forest Station at Empangeni.

The next meeting of the Board will be held in Maritzburg on Tuesday and Wednesday, the 22nd and 23rd inst., and on Thursday, the 24th, the Board, accompanied by the Minister of Agriculture, will start on an annual tour of inspection of the Winterton and Weenen Settlements. After visiting Winterton, the Board will inspect the farm "Varkensfontein," which is situated near Colenso, and which has, up to the present, been reserved in connection with a large irrigation scheme which it was at one time proposed to undertake.

Fruit and Vegetable Drying and Evaporating.

By E. R. Sawer, Director, Experiment Stations.

The organised export of fresh fruit, though offering a long sought remedy for the congestion of supplies at local centres of consumption, leaves our outlying districts still at a loss in view of the difficulties of transporting such perishable produce to the railway. The only means of utilising any surplus in such districts has in the past been that of preserving with the aid of syrups, etc. The process of bottling, however, entails much labour and the expense attendant on the many accessories required, such as sugar, cans, covers, etc. The process of evaporating consists briefly in preserving fruit, and vegetables by the artificial evaporation of their moisture, whereby their food value is not only not impaired but increased, and the products, perishable in their natural form, rendered capable of being stored in a concentrated form for future use or sale. Drying in the sun, while a cheap method, is in this country attended with considerable risk of rain at the time when the work would have to be carried out, and it is not so effectual as evaporating in a properly constructed machine, for in the former case the aroma and bouquet of the product is not only evaporated, but also dissipated. The use of trays placed one above another in the evaporator, while not sensibly retarding the drying process, causes the partially dried product in the higher trays to absorb the flavour and bouquet given off from the less dried produce in the lower trays.

METHOD OF EVAPORATING.

The method of setting fruit or vegetables to dry is really a simple one, and can be readily acquired. A fire is lighted in the oven, cold air passes in at the bottom opening, is heated on its passage, and is distributed by a deflector spreader, causing thus a free circulation of heated air through the trays placed in the upper part of the apparatus. A thermometer marks the temperature reached, and this latter can be modified by the admission of more, or the greater exclusion of, fresh air through the valve on the spreader. In case of the heat being too great, it may also be lessened by opening the fire-box. Ordinary coal can be burnt, so also can wood, coke, etc. The sides being double-cased, and the space between being filled with sand, ashes, or some slowly conducting material, very little heat is lost, as can be readily seen by placing the hand anywhere on the outside of the apparatus. The fruit or vegetables, after being cut, sliced, or otherwise prepared, according to their several requirements, are placed on the wire netting of the wooden trays in succession. The fluting of the wire netting allows of a larger drying surface being exposed, and more material can be dried, inasmuch as one piece does not, as a rule, come in contact with its neighbours, and so dries better and more rapidly. There are two ways of filling the upper part of the apparatus, the one being by putting each tray in successively from *below,* until the one first put in gradually rises to the top; the other way is by putting in each tray, as filled, at the *top* of the apparatus, and letting it work its way down until it reaches the bottom. Which way is to be adopted depends upon the kind of fruit or vegetable. Those kinds which, like apples, pears, and vegetables generally, are of a more or less hard nature are placed in at the bottom, *i.e.,* where the heat is greatest, the trays ascending successively until the top, or coolest part, is reached, while such materials as stone-fruit, berries, etc., which would, if at once exposed to a strong heat, burst the skin and let the juice escape, are placed in from the top, and the trays gradually work their way down. In this way the skin is not cracked, but slowly dries up and hardens, retaining the juice within the fruit.

TREATMENT OF FRUIT.

Apples.—The method of preparing apples to be evaporated is as follows: They are first pared, cored, and sliced by a very simple and ingenious machine which will either pare, core and slice the apples, or, by removing a knife, will only pare them as for whole apples or the so-called Normandy Pippins. After the apples have been pared, cored, and sliced they are placed in a tub of perfectly clean water, containing a small quantity of salt, which prevents oxidation and discolouration. They are then cut once vertically, and all bruises, specks, and parings trimmed away to produce the well-known apple rings of commerce. They are then placed thinly on a tray and entered at the lower end of the *upper* flue. Sometimes a little sulphur may be sprinkled on the furnace with great advantage for the purpose of bleaching the rings. The first tray remains in the position just mentioned until the second tray is ready—which will be in four or five minutes—to be placed under the first tray; the third tray is then filled in the usual manner and placed under the second tray, and when the fourth tray is ready the first three trays are pushed forward in the flue, and the fourth tray takes the place of No. 1, and so on until the top flue is full. On the arrival of the first tray at the upper end of the flue the contents are examined, and those that are sufficiently dried are removed, and the remainder turned over and returned down the lower and cooler flue. In many cases one tray will hold the whole of the contents (which are nearly dried) of two or three trays, the empty ones being taken away to be again filled with fresh fruit. The degree of heat used for drying apples is from 175 degs. to 240 degs. Fahrenheit; and the time occupied varies from two to four hours, according to the variety of the apple, but from two to two and a half hours is the usual time. Whole apples require a much longer time, eight to ten hours, according to size and variety.

Plums are dried in the same manner except that they are placed in the evaporator at once. They should be graded according to size and be uniformly ripe. During the process of evaporation plums ought to be removed from the evaporator once or twice for the purpose of cooling them and toughening the skin and so prevent bursting, which they are liable to do, because the skin does not allow the moisture in the fruit to freely escape when first placed in the machine. As soon as the plums commence to shrivel, all danger of bursting is past, and they may then remain in the evaporator until dry. The time required for plums is from six to ten hours, and the temperature requisite 240 degs. to 300 degs. Fahrenheit. Plums may be steamed for a few minutes and then split in half, thus entirely dispensing with the cooling process and considerably reducing the length of time required in drying. 100 ℔. of fresh plums will give about 30 ℔. of dried.

Apricots are simply cut in two, the stones being taken out, and the fruit then dried just like apples, at from 240 degs. to 250 degs. Fahrenheit. They take from two to three hours to dry. From 100 ℔. of fresh fruit, 10 to 12 ℔. of dried will result.

Peaches should first be peeled and then treated similarly to apricots. The temperature required is 200 degs. to 212 degs. Fahrenheit, and two to three hours to dry.

Pears for drying purposes ought not to be quite ripe. They are peeled, and either dried whole, or, more generally, are divided, and the seed-vessels cut out, the stems being left on. They then require steaming for eight or ten minutes, and are filled in from the bottom upwards. The temperature used is 212 degs. to 240 degs. Fahrenheit, and the pears will take five to seven hours to dry if divided, or seven to nine hours if whole. From 100 ℔. of fresh pears 12 to 16 ℔s. of dried ones will be obtained. When preparing the pears before drying, the flavour will be improved if a little sugar be added to the water in which they are cooked, and to this may be put the juice of the removed seed-vessels and peelings.

Strawberries.—Such fruits as strawberries, bilberries, etc., can quite easily be dried, and they retain their flavour satisfactorily. They are filled in from above, just as with cherries. They require drying for four or five hours at not too high a temperature, say, not higher than 140 degs. Fahrenheit.

Figs ought to be placed in the evaporator at once and treated the same as plums but without the cooling process.

Currants of all kinds only require "grading" before being dried. Time, two or three hours. Temperature, 180 degs. to 200 degs. Fahrenheit.

TREATMENT OF VEGETABLES.

All vegetables (herbs alone excepted) require, in addition to the peeling, slicing, or cutting up, to be steamed or cooked for five to seven minutes before they are dried. This is necessary in order to keep their colour and to prevent their becoming hard. When dried on a small scale the cooking in boiling water is generally sufficient. In factories, and where dried on a large scale, regular steaming apparatus is used. Like apples, vegetables are always filled in from below upwards.

French Beans.—These are cut into strips by a special machine, and cooked for a few minutes. A little soda added to the water helps to preserve their bright green colour. Time required for drying, three-quarters to one hour. Temperature 150 degs. to 160 degs. Fahrenheit. 100 ℔. of fresh beans give 10 to 12 ℔. of dry.

Peas require simply shelling and a few minutes' cooking. They should not be quite ripe, and are laid thinly on the trays, and will take one to one and a half hours to dry. Temperature, 212 degs. to 220 degs. Fahrenheit. 100 ℔. of green pods will yield about 10 to 12 ℔. of dried peas.

Cabbages.—With cabbages the mid-rib of the leaf is cut out, and also the thicker ribs when they occur; the cabbages are then cut up, cooked, spread thinly on the trays, and dried as usual for about three hours. From 100 ℔. of green stuff about 7 ℔. of dry cabbage can be got. Red cabbage must be cooked only for a very short time, or it will lose its colour.

Cauliflowers.—Cauliflowers are broken up into single pieces or lumps, cooked for about five minutes, and dried like cabbage. They often get a brown colour in drying, but, on cooking again, the white colour reappears. From three to four hours is required for the drying. From 100 ℔. of the fresh cauliflower heads some 4 to 5 ℔. of dried produce will be obtained.

Carrots.—Carrots are cleaned, scraped, and cut into slices of about one eighth inch thickness. After cooking they are spread lightly on the trays and dried for three hours to three-and-a-half hours. 100 ℔. of the fresh vegetable yield about 8 ℔. of dried carrots.

Celery.—Celery is cleaned, peeled, and cut into strips one-eighth inch thick. It must be cooked until half soft, and then laid on trays just like apple "rings." The drying takes three to four hours, and from 100 ℔. of fresh celery about 4½ ℔. of dry celery can be got.

Onions.—With onions the shell is removed, and they are cut into slices about a quarter inch thick. They take three to four hours to dry. From 100 ℔. of fresh onions 10 to 12 ℔. of dried onions may be obtained.

Potatoes.—After washing and peeling, potatoes can be either cut up into thin slices or into strips. When putting them in boiling water before drying it is well to add some salt to the water. They will dry in two or three hours at a temperature of 200 degs. to 212 degs. Fahrenheit (90 degs. to 100 degs. C.).

Herbs, etc.—Various herbs, such as parsley, mint, rosemary, lavender, woodruff, etc., can be similarly dried. They must not be put in boiling water before drying. With some, such as parsley, mint, etc., it is a good plan to grind them to a powder after drying.

Mushrooms will dry perfectly well, but *Asparagus* is of too watery a nature to deal with successfully by drying.

SELECTION OF FRUIT.

When fruit is intended for sale, care must be taken in the selection, alike as regards uniformity of kind, size, ripeness, soundness, and quality. This can never be secured if a number of different sorts of apples for instance are dried together, or fallen fruit is used with sound fruit.

PACKING AND STORING.

After fruit or vegetables have been dried they ought to be left exposed to the air for six or seven days in a dry, well-ventilated room. If put away in boxes at once after drying, they are apt to become mouldy. They need watching from time to time while in the store room, and any bad fruit, etc., must be removed, or that which turns mouldy must be further dried in the oven. After this, the produce may be packed in wooden boxes, bottles, etc., and will keep perfectly well, though not excluded from the air.

PREPARATION OF THE DRIED MATERIAL FOR USE.

When required for use, the dried fruit or vegetables merely require soaking in warm water for four to six hours, according to the nature of the material. After the soaking, they are cooked just as one would cook fresh fruit or vegetables. Apples should be cooked in the same water as that in which they are soaked. Vegetables, when required for soups, need no preliminary soaking, but are put in the broth direct, long enough beforehand to ensure their becoming tender.

See to your plough mouldboards this spring, and don't put them away after ploughing without giving them a coating of heavy grease first, otherwise you will only have yourself to blame for the rust that appears on them. In fact, all your implements should be well oiled and looked after: because machinery is made for farm use it does not follow that it is made for the use it often receives on the farm.

European Prices of Sugar.

THE following statement was prepared by the British Board of Trade in response to an Order of the House of Commons, dated 15th July, calling for a return "showing, with regard to London, Paris, and Berlin, the price of sugar and the duty levied thereon at the first day of March, 1903, 1904, 1905, 1906, and 1907 (in continuation of Parliamentary Paper No. 132, of Session 1906)."

With regard to this return, it is explained that the prices given are those of the kind of sugar most largely consumed by the working classes in each capital. It is not to be understood that the prices refer to a uniform grade of sugar in the three cities.

	RETAIL PRICE OF SUGAR AT MARCH 1ST.				
	1903	1904	1905	1906	1907
LONDON :	*d* per lb.	*d* per lb.	*d.* per lb.	*d.* per lb.	*d.* per lb.
Retail Price ...	1¾	1¾	2¾	2	2
Customs Duty ...	0·45	0·45	0·45	0·45	0·45
Excise Duty ...	...	...	...	...	...
PARIS :					
Retail Price ...	4¼	3	3½	3	3
Customs Duty‡ ...	3·23*	1·44*†	1·44*	1·44*	1·44*
Excise Duty ...	2·79*	1·18*†	1·18*	1·18*	1·18*
BERLIN :					
Retail Price ...	3¼	2¾	2¾	2¼	2¼
Customs Duty‡ ...	2·18	1·02†	1·02	1·02	1·02
Excise Duty ...	1·09	0·76†	0·76	0·76	0·79

*Including also the "*taxe de raffinage*," levied equally on imported sugar and on sugar of home production.

†In force from 1st September, 1903.

‡In France and Germany imported sugar is subject to Excise Duty in addition to Import Duty proper. The "Customs Duty" stated above for these countries includes the total amount of duty payable on importation—*i.e.*, it includes both Import and Excise Duty.

Glanders Regulations in Great Britain.

An Order issued by the British Board of Agriculture on the 23rd August last contained regulations for dealing with glanders or farcy in horses, asses, and mules.

Notification of the presence of the disease having been made with all practicable speed to an Inspector of the Local Authority, through a constable of the police force, the Local Authority is empowered to order the slaughter of all diseased animals and the quarantine of all suspected or in-contact animals, during which quarantine they may be subjected, with the consent of the owner, to the mallein test by a Veterinary Inspector of the Local Authority. Should the test result in definite evidence of the disease in an animal, the animal must be slaughtered at once; whilst in a case where the indications obtained as a result of the test do not, in the opinion of the Veterinary Inspector, amount to definite evidence of the disease, the test is to be applied a second time, before twelve days elapse. If the second application does not result in definite evidence of the disease, the quarantine requirements can be withdrawn.

In the case of every animal slaughtered, in which at the time of slaughter the clinical symptoms are not definite evidence of the disease, a *post-mortem* examination, by a Veterinary Inspector, is required to be held. If this examination does not show that the animal was affected with glanders, the Local Authority is required to pay to the owner, out of the local rates, the full value of the animal immediately before it received the mallein test, as compensation, but the sum paid may not exceed £50 for a horse, or £12 for an ass or mule. Should, moreover, the veterinary examination show that the animal was affected with glanders, the Local Authority is required to pay one-half of the value of the animal, the maximum being £25 for a horse and £6 for an ass or mule.

Power is given to Local Authorities to make such regulations as they may think fit for any of the following purposes: (*a*) for providing for the cleansing and disinfection of places used by, and of utensils, mangers, feeding-troughs, pens, hurdles, or other things used for or about any diseased animal; (*b*) for providing for the cleansing and disinfection of vans or carts or other vehicles used for carrying any diseased horse, ass, or mule on land otherwise than on a railway; (*c*) for prescribing the mode in which such cleansing and such disinfection are to be effected; (*d*) for providing that such places, utensils, etc., are to be cleansed and disinfected at the expense of the Local Authority, or of the owner, lessee, or occupier thereof; (*e*) for regulating the taking out of any stable, building, field, or other place of any fodder, litter, or other thing that has been in contact with or used for or about any diseased horse, ass or mule; and (*f*) for requiring the removal by the owner from contact with horses, asses, or mules, of litter used for or about any diseased animal. If any person fails to cleanse and disinfect in accordance with such regulations, the Local Authority may have the work done and recover the expenses thereby incurred from him.

It is made unlawful for any person to allow a diseased animal to appear in any public place or thoroughfare or on a common or unenclosed land; and where an animal is found under such conditions, the Local Authority is empowered to order its destruction, any expenses incurred in connection therewith being recoverable from the owner of the animal.

The carcases of animals slaughtered must be buried in quicklime, or burnt, or destroyed by chemical agents, or be disposed of in any other manner as the Board of Agriculture may permit by license.

Under this Order no horse, ass, or mule, brought to Great Britain from any other country except Ireland, the Channel Islands, or the Isle of Man, can be landed unless it is accompanied by a certificate of a veterinary surgeon to the effect that he examined the animal immediately before it was embarked, or whilst it was on board the vessel, as the case may be, and that he found that the animal did not show symptoms of disease. The Order further enacts that if any horse, ass, or mule is landed in contravention of the Order, the owner thereof, and the owner and the lessee and occupier of the place of landing where such animal is landed, and also the owner and the charterer and the master of the vessel from which the same is landed, shall, each according to and in respect of his own acts and defaults, be deemed guilty of an offence against the Act of 1894; and renders himself liable to a penalty of £20.

Under the "shares" or *metayage* system of farming in vogue in certain parts of France—principally in the department of Allier—the cultivator tills the soil for the land-owner on condition of receiving a share, generally a half, of its produce, the owner furnishing the whole or part of the stock, implements, etc.

It is estimated that growing pigs placed on rape at about twenty-five to the acre will for two or three months require only half as much grain as sty-fed animals. Pigs running out like this also tend to become stouter and healthier than when in confinement. They will live and grow on the rape without a supplement of grain, but a small addition of the latter has been found profitable. Dry sows, however, will do well on the rape alone.

Irrigation and Drainage.

Where natural drainage is not afforded, it must sooner or later be supplied by man. The amount of water which is actually taken up by plants is perhaps but a small part of what is usually applied to the land by irrigation. The excess water, with the exception of what is evaporated, soaks away into the soil and seeks the lower levels; and it is from the accumulation of this water in the low places that the necessity for drainage comes.

The experience in the Yakima Valley of the State of Washington, U.S.A., has, according to Mr. S. O. Jayne, of the U.S. Office of Experiment Stations, who has prepared a lengthy report on irrigation in the Yakima Valley, been such as to confirm the rule that may be laid down with regard to practically every irrigated district in the Western States, or wherever irrigation is practised, that drainage is always a necessary adjunct, and must go hand in hand with it. Some sections, he says, are so favoured by nature as to have this requirement supplied, but the majority of the irrigated districts of the West are not so fortunate in this respect, and the Yakima Valley is one of these. Before irrigation was begun, the subsoil on the higher lands was, we are told, practically without moisture, and its capacity for absorption was therefore large, so that the excess water for a few years was taken care of, and the necessity for drainage in many places was not realised until much damage had resulted. There are thousands of acres of what has been valuable and productive land, now practically worthless swamp or alkali waste, because the need of drainage was not soon enough realised and the means for it provided.

Six drainage districts have been organised in Yakima County, and thousands of dollars have been spent for the construction of ditches where fifteen years ago the idea of drainage was not dreamed of, and where if one had suggested such for future need he would have been considered mentally unbalanced. This work was delayed too long, and the delay has so increased the cost of construction that, where thousands have now been spent, hundreds would have been more than ample if the work had been undertaken before the damage had gone so far. These lands requiring drainage are not confined to the Yakima county, but are found throughout the valley wherever irrigation has been practised for any length of time.

The low lands, especially those under the lower or older canals, are the first to suffer, and it is not many years from the time high line ditches are built and in operation until the injury begins. The injury, moreover, is not always to the low-lying lands alone: in some places the need of drainage is plainly evident, even on hillsides with comparatively steep slopes. This is due to the outcropping of hardpan or impervious strata along which the water gradually works from the higher levels, and, coming out on the hillsides and evaporating, leaves the fatal alkali, which destroys the crops and ruins the land.

In the Yakima district a large amount of drainage, Mr. Jayne advises, should be done; and there are also in the Ellensburg district considerable areas now worthless for anything more than pasture, all due to the same cause—excessive irrigation. At Kennewick, where the summer of 1906 was the fourth season that water had been flowing in the canal, there is increased evidence of the need of drainage, and already several hundred acres have been transformed from sandy desert to duck ponds. The question of drainage is one of growing importance with every year that irrigation continues. Experience has shown that delays are fatal when the struggle is against the combination of water and alkali, and for this reason all possible precautions should be taken in the future to forestall such injuries as have already been experienced, due to neglect in providing drainage in proper time.

Points of a Berkshire Pig.

THE following schedule, recently revised by a special committee of the British Berkshire Society, was adopted by the council at their Smithfield meeting in December last:—

Colour.—Black, with white on face, feet and tip of tail.

Skin.—Fine and free from wrinkles.

Hair.—Long, fine and plentiful.

Head.—Moderately short, face dished, snout broad, and wide between the eyes and ears.

Ears.—Fairly large, carried erect or slightly inclined forward and fringed with fine hair.

Neck.—Medium length, evenly set on the shoulders; jowl full and not heavy.

Shoulders.—Fine and well sloped backwards, free from coarseness.

Back.—Long and straight, ribs well sprung, sides deep.

Hams.—Wide and deep to hocks.

Tail.—Set high and fairly large.

Flank.—Deep and well let down, making straight underline.

Legs and Feet.—Short, straight and strong, set wide apart, and hoofs nearly erect.

Objections are a perfectly black face, foot, or tail. A "rose" back. White or sandy spots on the body. A white ear. A very coarse mane, and inbent knees.

The Destruction of Locusts.

S.A. LOCUST BUREAU'S SUGGESTIONS.

The Committee of Control of the South African Central Locust Bureau recently submitted a report to the various South African Governments containing some recommendations in connection with the destruction of locusts with arsenical solutions, based upon the results of a successful use of it over such widely different topographical conditions as those presented by the abrupt and hilly nature of Natal and the plains of the Transvaal and Orange River Colony.

In preparing the poison, white arsenic, soda, and treacle as a sweetening agent were originally used by the planters of Natal. In the course of the Government's operations it was found impracticable to transport treacle advantageously over long distances, and treacle sugar and mill sweepings were adopted. Subsequently, on the suggestion of Mr. C. P. Lounsbury, the Cape Entomologist, a trial was made with arsenite of soda in Natal, and this proved of so great an advantage, economically, over the arsenic and soda solution that it is now adopted by all the Governments.

In view of the advisability of a more general adoption of poisoning than even now exists, the Committee has made the following suggestions in order that recognised formulae for the preparation and use of such poison may be agreed upon.

The formulae for arsenical solution for the destruction of wingless locusts are given—the white arsenic solution and the arsenite of soda or sodium arsenite solution.

White Arsenic Solution.

Formula.

White Arsenic (Arsenious Oxide)	1 pound.
Soda (Caustic or Washing)	8 ounces.
Sugar or Treacle	2—4 pounds.
Water	17 gallons.

Boil the arsenic and soda together with 2—3 gallons of water in a 4-gallon tin or pot until the arsenic is quite dissolved. While this is being done dissolve the sugar in another vessel. Mix together with the balance of the water and the solution is ready.

Arsenite of Soda or Sodium Arsenite Solution.

Formula.

Arsenite of Soda	1 pound.
Sugar or Treacle	2—4 pounds.
Water	16 gallons.

Mix the arsenite of soda and sugar (or treacle) in sufficient cold water to thoroughly dissolve them; when this is accomplished add the balance of water and the solution is ready for use. The arsenite of soda will dissolve more readily in hot water than cold, but it is only necessary to do this when the saving of time is the main object in view. In preparing large quantities of solution it is best to place the arsenite of soda in water and allow it to remain there overnight, about one gallon of water should be allowed for each pound weight of the arsenite. By suspending the poison tied in a sack, in the water, the dissolving thereof is facilitated.

USE OF THE SOLUTION.

(*a*) Whichever solution is adopted should be sprayed on the grass, bushes, etc., which the locusts are eating, or just about to eat. When they are small it may be sprayed among them or in a circle around them; but, when large and on the move, a strip of grass along their front should be sprayed.

(*b*) The solution is best applied with a spray pump, and for the purpose the "Deming's Success" Bucket Pump, fitted with a "Bordeaux" nozzle, has been found the most suitable. These spray pumps require a certain amount of care in handling, and it is well to practise with water before using the solution. The nozzle must be adjusted to throw a fine mist to fall lightly on the grass without drenching it. The nozzle of the pump should not be turned off whilst pumping is going on or whilst there is pressure from the air-chamber. If this is done, not only is the hose loosened but it may very often burst or be otherwise damaged by the great pressure of the liquid contained in it.

(*c*) A good time to spray is when the locusts are camping for the night or otherwise in the very early morning before they spread out and become active in the heat of the sun.

VARIOUS STRENGTHS OF SOLUTION.

(*a*) In preparing the solution an ordinary paraffin tin may be used as a 4-gallon measure for the water, the ordinary 4 ℔. golden syrup tin makes a convenient measure for treacle, and a bully-beef tin or a large cup will hold 1 ℔. of arsenite of soda. Large quantities, however, should be weighed where the weight contained in the package is unknown.

(*b*) Whilst the locusts are young, *i.e.*, in the first two weeks of their growth, the solution should be prepared as follows:—

Arsenite of Soda—1 ℔. (1 beef tin or large cupful).
Sugar—2 to 4 ℔s. (2 or 4 beef tins or 2 or 4 large cups full).
Or Treacle—2 or 4 ℔s. (1 syrup tin full).
Water—16 gallons (4 paraffin tins full).

(*c*) When the locusts are half-grown, *i.e.*, from 2 to 5 weeks old, the solution should be strengthened to:—

Arsenite of Soda—1 ℔.

Sugar—2 to 4 lbs.
Or Treacle—2 to 4 lbs.
Water—12 gallons (3 paraffin tins full).

(*d*) For large hoppers with wing-pads well defined, from 5 to 8 weeks old, use:—

Arsenite of Soda—1 lb.
Sugar—2 to 4 lbs.
Or Treacle—2 to 4 lbs.
Water—8 gallons (2 paraffin tins full).

(*e*) A solution stronger than one pound of arsenite of soda to eight gallons of water should on no account be used.

(*f*) Locusts when poisoned may take up to four days to die off.

(*g*) Packages containing arsenic or arsenite of soda should be marked "Poison," and kept under lock and key.

(*h*) Analysis has shown that 36 lbs. of grass, sprayed with the strongest solution recommended will, if eaten, contain sufficient arsenic to kill a young calf; and 72 lbs. an ox. Therefore all animals should be kept away from the sprayed areas until the arsenic has burned the grass and caused it to die, or until a heavy rain has washed it off.

(*i*) As the solution has a caustic effect and not unusually induces sores upon the bare legs of natives when spraying, they should be provided with trousers or leggings of sacking or otherwise with grease to rub the limbs before commencing the day's work.

(*j*) Care must, of course, be taken to prevent animals drinking from vessels containing the solution.

(*k*) If these precautions are carried out no accidents need occur.

Just as we go to press advice has come to hand that Natal mealies are now realising 28s. per quarter on the London market.

Cows giving the greatest quantities of milk exhibit the greatest appetites for salt, remarks the *Quarterly Journal* of the Bengal Department of Agriculture. About three-quarters of an ounce of salt is necessary for every 1,000lbs. of live weight, and six-tenths of an ounce for every twenty pounds of milk yielded. Cows are never, in actual practice, entirely deprived of salt, since every form of food they consume contains a larger or smaller amount of salt, but often not enough to supply the demand of the animal system together with that which finds its way into the milk.

ENTOMOLOGIST'S OFFICE
NOTES OF THE MONTH

Locusts in September.

The movements of locust swarms throughout the month of September may be characterised as restless. During the first and second weeks of the month the Greytown and New Hanover districts and districts to the north of Maritzburg were visited by numerous and very large swarms. These, however, seem to have completely disappeared before the middle of the month.

The reports as received are tabulated below. X, represents settled swarms; and O, circling swarm; f—fairly, v—very, l—large, s—swarm.

Date.	Locality.	Direction of Flight, etc.
	FIRST WEEK.	
September.		
1.	Albert Falls (f.l.s.)	S.W.
	Noodsberg (v.l.s.)	N.W.
	Wartburg (v.l.s.)	N.-S.
	Swaiman's Location	X
	Impolweni Mission	X
	Krantzkop	S.
	Moguntia	X
2.	Ndwedwe (l.s.)	W.
3.	Krantzkop (3 swarms)	X
4.	Mid-Illovo	X
	Eshowe	S.
	Albert Falls (l.s.)	N.
	Eshowe	S.
	Krantzkop (2 swarms)	X
5.	Mid-Illovo, Kleinthal	X
	Mtunzini	S.
	St. Faith's, Ixopo	S.W.
	Eshowe	S.
	Hilton Road	N.
	Mid-Illovo, Stirling	X
	FIRST WEEK (Continued).	
September.		
6.	Mid-Illovo	X
	Ndwedwe (all over district)	X
7.	Richmond, Rosebank	X
	Howick	N.
	Mtunzini	O
Police Station reports for week ending:—		
	Nqutu, Red Hill, Bluff, Tongaat, Hillcrest, Babanango, Impendhle, Umhlali, Vryheid (Leuwnek), Ndumu, Maputa	nil.
	SECOND WEEK.	
8.	Greytown, Ematimatolo	N.E.
	Paulpietersburg	E.
	Sinkwazi	W.
	Glendale	W.
	Mapumulo	X
	Nkandhla	S.E.
	Noodsberg (v.l.s.)	X

Date.	Locality.	Direction of Flight, etc.
	SECOND WEEK (Continued).	
September.		
9.	Empangeni	N.E.
	Dalton	E.
	Verulam	nil.
	Paulpietersburg	S.E.
10.	Greytown (v.l.s.)	O
	Crammond	N.
	Harburg	O
	Pivaan's River	N.
11.	New Hanover District	O
	Mabendhlana, Ixopo	O
12.	Albert Falls (v.l.s.)	S.
	Claridge	N.
	Mapumulo	E.
	Mtunzini (l.s.)	N.W.
	Nongoma (v.l.s.)	S.W.
	Umtamvuna (v.l.s.)	W.
	Manderston (l.s.)	W.
	Ndumu (v.l.s., from across border)	S.
14.	Glendale	S.E.
	Police Station reports for week ending: Tabankulu (Vryheid), Nqutu, Babanango, Tongaat, Avoca, Scottburg, Umhlali, S.C. Junction, Verulam	nil.
	THIRD WEEK.	
15.	Insuzi	N.W.
	Ingwavuma	X
16.	Springvale, Ixopo	X
	Vryheid District (several swarms)	O
17.	Harding, Mt. Pleasant	S.W.
18.	Cato Ridge	N.
	Stanger (l.s.)	O
	Highflats	N.E.
	Ismont	O
	Harding	W.-E.
	Stanger (l.s.)	S.E.
19.	Mapumulo	O
21.	Ndwedwe	O.
	Reit Valley (l.s.)	N.W.
	Mid-Illovo	E.
	Police Station reports for week ending: Tongaat, Umhlali, Avoca, Verulam, Scottburg, Nqutu, Babanango, Isipofu	nil.

Date.	Locality.	Direction of Flight, etc.
	FOURTH WEEK.	
September.		
22.	Richmond	N.E.
	Umquahumbi Valley	X
25.	Mehlomonyana (l.s.)	X
	Eshowe	S.
	Ndumu	S.
26.	Umtamvuna (v.l.s.)	S.
	Verulam (l.s.)	N.E.
	Kearsney	W.-E.
	Empangeni (2 swarms)	N.E.
29.	Tongaat (2 v.l.s. swarms)	W. & E.
	Nongoma (v.l.s)	S.
30.	St. Faith's	X
26.	Empangeni	N.W.
	Stanger (v.l.s.)	E.
	Nongoma	S.
	Inyoni (supposed to be laying eggs)	N.W.
27.	Stanger (l.s.)	E.
	Umhlali (l.s.)	N.
	Ixopo (v.l.s.)	N.
	Mseleni, Ingwavuma	S.E.
	Darnal	N.E.
	Ingwavuma	N.E.
28.	Springvale	X
	La Mercy (biggest swarm for years)	S.W.-E.
	Camperdown	S.
	Tongaat	N.E.
	Umquahumbi	S.E.
	Doesburg	S.E.
	Mt. Edgecombe	N.
	Verulam	N.
	Ottawa	N.
	Inyoni	O
	Nongoma (v.l.s.)	E.
	Inchanga	S.W.
	Melmoth (v.l.s.)	N.E.
	Melmoth (l.s.)	S.
	Police Station reports for week ending: Ingwavuma, Nqutu, Babango, Mehlomnyana, Avoca, Leuwnek, Impendhle, Ematimatolo	nil.
30.	Murchison (v.l.s.)	N.W.
	Mid-Illovo	S.W.
	Equeefa (free for past month).	

LOCUST FORECAST FOR NOVEMBER.

From information collected and supplied, it is possible to forecast the appearance of hoppers in the following areas, during next month—for all practical purposes, nearly a month earlier than last season, and about two months earlier than usual.

ZULULAND.

Mtunzini Division	November	8th—12th
Lower Umfolosi Division	,,	10th—14th
Ndwandwe Division	,,	15th—20th
Eshowe Division	,,	15th—20th

NATAL.

Vryheid	November	15th—20th
Umvoti Location (Mapumulo)	,,	15th—20th
Lower Tugela	,,	11th—20th
Mount Edgecombe	,,	11th—14th
Verulam	,,	20th—24th
Umlazi Location	,,	20th—24th

A SNAKE AND SOME LOCUSTS.

Writing under date of the 18th October, Mr. Berensberg reports:—"On the road to Verulam I saw a yellow snake feasting on the locusts. I did not interfere, but left it to its occupation. Only the head was visible, and when a locust settled down before it—a quick movement, and the locust was devoured. During the few minutes that I watched the snake it swallowed about half-a-dozen."

THE EGG-LAYING OF THE REDWING LOCUST.

One is very often asked how soon locusts lay after pairing, and, for practical purposes, it may be taken for granted that where the insects are seen pairing about there they lay, within a few days.

Egg-laying is not so commonly observed as one might imagine. This is due to the fact that as often as not the act has taken place and is completed by the time one is about in the morning. This is, I think, the reason why everybody does not see the locusts laying their eggs. Several examinations of locusts, taken whilst copulating, have been made this season (October), and in all cases the eggs are fully developed so that they may be deposited directly they are impregnated. Further information as to what becomes of the males and females after laying, may be gathered this year by those who are sufficiently interested in the matter.

LOCUST DESTRUCTION.

Compulsory Legislation.

Speaking, at the request of the President, to the resolution urging the necessity of compulsory legislation for the destruction of locusts, before the Annual Meeting of the South African Agricultural Union held recently in Pretoria, the Natal Entomologist remarked *inter alia*:—

"My friend, the Reverend Mr. Scott, has already told you that in Natal we have a Law providing for the compulsory destruction of locusts. On three separate occasions we have had to amend that legislation, and the present Act now in force is not perfect. If the other Colonies are going in for compulsory legislation it is not so much the Natives that would be affected thereby as the Europeans. The people themselves must take this matter up. The principle adopted in Natal is this: The Government undertakes the destruction of locusts in Native locations, and calls upon the farmers to destroy the locusts on their lands.

"We destroy the hoppers in the locations for several reasons, and these are not sentimental. In the first place, we save the crops; this obviates a famine, and, in the second place, the planters and farmers have not to contend with the fliers which would otherwise come from the locations and destroy their autumn and winter crops.

"This destruction of locusts by the arsenical solution has been done under my supervision for the past five or six years.

"To within a few weeks, the genesis of this method of destroying locusts occurred eight years ago in an experiment I conducted in one of the cane plantations directly I arrived in Natal. The following year the Government assisted two Coast Farmers' Associations in destroying locusts and, the next year, a number of up-country farmers as well. This work was so successful that the Natal farmers urged upon the Government the necessity of enforcing the Locust Act stringently.

"Nowadays we destroy as far as we can in the locations—the money being provided by the Government. We call upon the farmers in Natal—and at their own request—to destroy the locusts on their lands. There have been only one or two occasions on which we have been compelled to prosecute farmers under the Law. There have been many instances in which it might have been desirable to prosecute.

"My personal feeling in the matter is outlined in the first report to the Natal Government on locust destruction, and is practically the scheme since adopted by the Transvaal. I feel that an invasion of locusts is a matter of providence, and I think it is a very hard thing for the farmer afflicted to be compelled to destroy the pest wholly at his cost. When he does so, he is working for the good of his surroundings, and for the whole Colony, and I therefore think that he should be helped in his work by the State. If you decide on having compulsory legislation for the destruction of locusts, then let the State provide the materials.

"If a swarm of locusts invade a certain district, it is useless for one man to destroy. Nothing but combined action will be effective; and, therefore, if I may give an opinion in the matter, I will say that, for anything like success, compulsory legislation is absolutely necessary, because you have to get at those people who will do nothing.

"I do not think I can give you any further information.

"Natal has its legislation. It is being amended slightly this year by fresh regulations, and I have no doubt it will be further amended if necessary. It is a matter in which the whole of Natal supports its Government.

"I would notice that the Orange River Colony has lately passed an excellent Law, and it would be advisable for the other Colonies to have compulsory legislation too, but in such a matter, you must first have the people of the country behind you."

East Coast Fever.

REGULATIONS AND RESTRICTIONS.

By a Government Notice issued early in October that portion of the Umsinga Division south of the Tugela River was constituted, for the purpose of carrying out the provisions of the East Coast Fever Acts and Regulations, a portion of the infected area included within the Magisterial Division of Weenen. On the 12th October the Magisterial Division of Nkandhla (Zululand) was declared a separate infected area within the meaning of the E.C.F. Act, and the ingress, egress, or movement of cattle into, from, or within that area was prohibited.

By the provisions of a Government Notice issued on the 7th October, no further permits are to be issued for the removal of slaughter cattle from the Magisterial Division of Dundee south of the Vryheid railway line; from the Magisterial District of Umsinga, and from that portion of the Klip River Magisterial District on the east of the main line of railway in the vicinity of Wessel's Nek, which is an actually infected East Coast Fever area, except in cases where the applicant for a permit has purchased the whole of the horned stock belonging to any one individual, as provided for under the amended East Coast Fever Act of 1907. All permits issued expired on the 12th October.

Tabakscultuur in Zuid Afrika.

MET SPECIALE TOEPASSING OP NATAL.

Door E. R. Sawer, Directeur, Proef Stations.

(*Vervolg.*)

Tabaks Mesten en Fertiliseerders.

Tabaksoorten, ander dan pruim blad en snuifsoorten, worden bebouwd en vervaardigd voor de produkten van combustie of rooken, en hunne brandende hoedanigheden zijn derhalve van het eerste belang. Het woord "branden," als toegepast op tabak, heeft betrekking op verscheidene goed bepaalde kenmerken die alle door den planter en den vervaardiger in aanmerking genomen moeten worden. Om den koopers aannemelijk te zijn moet het bewerkt blad stadig en gelijkmatig vuur houden zonder eene strekking om te "verkolen" of "carboniseeren" verder dan de werkelijke brandende plek. Combustie moet voldoende trapsgewijs zijn om ontvlammende of ontploffende actie te verhinderen, en verder vereischt de markt dat het mineraal overschot, of "asch," wit van kleur en ferm aaneen moet zijn. De afwezigheid van eenige dezer hoedanigheden mindert de waarde van het blad of de vervaardigde producten ernstig, en, daar men ze kan beheeren door een zorgvuldige keus van localiteit, grond en mestsoorten, zal eene bespreking van de methoden beschikbaar om een bevredigend resultaat op te leveren niet onpasselijk zijn.

Het tabak blad wordt gekenmerkt door een ruim inhoud van minerale stof, die dikwijls 20 per cent. van het totale gewicht te bovengaat en een aller belangrijkst uitwerking heeft op de combustie van het organisch materiaal. De gloeiende capaciteit van tabak is afhankelijk van de groote evenredigheid der minerale zouten en als deze onttrokken worden zal het blad opvlammen. Dus gebeurt het dikwijls dat grove geile tabak een neiging toont te ontvlammen wanneer aangestoken hetgeen te wijten is aan een aanmerkelijk gebrek aan minerale bestanddeelen; en, desgelijks, kan de verwijdering van oplosbare zouten door "wasschen" of "doopen" van het blad voor het op te rollen de brandende kwaliteiten schadelijk aandoen. Zekere stoffen belemmeren de combustie terwijl andere het bevorderen en de betrekkelijke hoeveelheden van voorgenoemde en laatstgenoemde zullen den aard van het branden bepalen.

De moeielijkheid om een voldoende hoeveelheid kraalmest gedurende het tegenwoordige seizoen te verkrijgen, wegens de verwoestingen aangericht onder onze beesten door Oost Kust Koorts, verleent een additioneel belang aan handels fertiliseerders als alternatief. Dit gevolg is niet heelemaal te betreuren, want het onbeperkt gebruik van grove organische mesten heeft in het verleden de maatstaf van veel van het plaatselijk blad verlaagd, en de vervanging van minerale fertiliseerders behoort het gewenschte effekt te hebben om een fijner type blad met een meer delicaat geur te produceeren.

Een zekere hoeveelheid organisch stof in den grond is, echter, noodwendig voor goede resultaten en bevordert verder het behoud van vocht gedurende perioden van droogte. Als deze te kort schiet dan wordt het best aangebracht door een groene mest oogst onder te ploegen hetzij voor of na het planten van de tabak. Wolfsboonen, de roode kaffer boon, koe erwt en soja boon zijn geschikt voor dit doel, en behooren met de afsnijdende schijf weggesneden en onder geploegd te worden zoolang zij bloeien. Op deze wijze kan uitputting van den grond verhinderd worden en dezelfde grond herhaaldelijk met tabak beplant worden.

Vele der fertiliseerders in algemeen gebruik voor de voornaamste gewassen zijn niet geschikt voor tabak, en de keus moet gegrond worden op een duidelijke kennis van den invloed der verschillende beschikbare zouten op de brandende hoedanigheden van het blad. Het is herhaaldelijk duidelijk aangetoond dat alle chloor en zwavelzuur zouten benadeelen de brandende en vuurhoudende capaciteit van het blad, terwijl, aan de andere hand, zouten van potasch en kalk aangebracht moeten worden in een of anderen vorm. De vuurhoudende capaciteit hangt inderdaad af van de aanwezigheid van potasch, en kalk is noodig voor het produceeren van een goed gekleurd vastklevende asch. Phosphoorzuur zouten zijn practisch neutraal in hun effekt op het branden doch voordeelig in zoo ver als zij de kracht van het gewas kunnen vermeerderen zonder de kwaliteit van het produkt te beschadigen. Waar een lichtgekleurd, milde geur blad gewenscht wordt, moet men stikstof (nitrogeen) houdend mestsoorten heel spaarzaam gebruiken, daar zij een aanmerkelijk effekt hebben op de hoeveelheid nicotine, en zijn gevolgelijk aangewezen, aan de andere hand, voor prop, snuif en andere sterke soorten tabak.

De meerderheid van onze gekeurde tabaks gronden bevat een merkbare hoeveelheid kalk, niettemin zal het gewas in vele gevallen bevoordeeld worden door een toevoeging van deze prikkelstof, die niet alleen de blussching van den grond betert, doch tevens de snelle ontwikkeling der planten onderhoudt, ze meer spoedig door den wortelenden stadium brengende. Het chloor en zwavelzuur zout van het kalkmetaal moet vermeden worden, op welke kosten ook; zelfs in matige hoeveelheden zijn zij zeer schadelijk. In bijna alle districten moet de natuurlijke grond inhoud van phosphoorzuur zouten en potasch aangevuld worden na den eersten oogst door kunstmatige voorraden. Voorgenoemde behooren aangebracht te worden in den vorm van basic slag of phosphoorzuur waar transport van belang is, liever dan in den vorm van beenderen phosphoorzuur zout dat minder gereedelijk beschikbaar is. Daar potasch niet aangewend kan worden als het chloorzout noch als het zwavelzuur zout om de redenen bovenvermeld, zijn de eenige practische bronnen van voorraad het koolzuurzout en het nitraat; feitelijk bevatten haast al de geoctrooide tabaks fertiliseerders laatstgenoemd zout als een essentieel bestanddeel. Een waarschuwing is noodig tegen het gebruik van de gemeener soorten handels nitraat dat dikwijls een schadelijke hoeveelheid chloorzouten bevat en men behoort een waarborg te krijgen dat deze geen twee per cent. van het totale gewicht te boven gaan.

Ten opzien van het feit dat eene tabaksnijverheid aangelegd is in afgelegen districten van Natal verwijderd van den spoorweg, is de kwestie van vrachtgelden een allerbelangrijkste consideratie, en is een zeer geconcentreerd fertiliseerder wenschelijk. Een formule is dientengevolge opgesteld die een bepaalde betrekking heeft tot deze vereischte en tot de geaardheid van onze tabaksgronden, de correspondeerende fertiliseerder bevattende zes deelen van geconcentreerde superphosphoorzuur zout, twee deelen nitraat van potasch, en twee van beenderenmeel. Deze complete minerale mest kan verschaft worden tegen den prijs van £8 5s. per ton plus vrachtgelden tot by de bestemde plaats van distributie, en behoort aangewend te worden in de evenredigheid van 200 ℔s. per acre. Het voordeelig gebruik van hooge prijs fertiliseerders is eene vingerwijzing tot succesvolle tabaks-aanplanting, en eene uitgaaf van £20 per acre in dit verband is geen buitengewone zaak in vele tabaks districten van de Vereenigde Staten, daar een voldoende winst opgeleverd wordt door de kwaliteit en het gewicht van het blad dientengevolge geproduceerd. Dat het tabak gewas zeer uitputtend is kan niet ontkend worden, en het is bewezen geworden dat een oogst van 6,000 ℔s. verwijdert uit den grond 274 ℔s. stikstof, 44 ℔s. phosphoorzuur en 170 ℔s. potasch, terwijl het overschot, namelijk de stengels en wortels 598 ℔s. stikstof, 184 ℔s. phosphoorzuur en 792 ℔s. potasch bevatten. Laatstgenoemde kunnen en behooren in den grond teruggebracht te worden, maar de vereischten der bladeren, zonder meer, noodzaken de gedurige aandacht tot aanvulling van onze tabaksgronden als men uitputting wil verhinderen, voor welk doel een zorvuldige rotatie van gewassen, een stelsel van groen mesten en geschikte fertiliseerders regelmatig aangewend moeten worden.

VERPLANTING.

Het doel van den tabakplanter behoort te zijn om het gewas tot rijpheid te brengen binnen zestig tot zeventig dagen na de verplanting. Zulk een resultaat kan alleen verzekerd worden wanneer de grond tot de best mogelijke fijnheid gebracht is door herhaaldelijk ploegen en eggen. Gelijke cultivatie is alleen dan veroorloofd wanneer er geen mogelijk gevaar is dat het water aan de oppervlakte van den grond zal blijven staan, en op alle landerijen, behalve die goed gedraineerd, behooren er "ridges" opgeworpen te worden door twee vlakke voren samen te trekken door een lichte tuin ploeg. Dit systeem verhindert ook de beschadiging der blaren door bespatting met modder wanneer het hard regent en verschaft bovendien een middel tot besproeiing van het gewas. Indien gewenscht kunnen heuveltjes gevormd worden door kruisvoren te trekken op zoodanige afstanden als men van plan is de plantjes in de rijen van elkander te zetten, waarna de twee open zijden van het heuveltje getrokken worden naar het midden en dan wordt de top plat gemaakt met een graaf. De breedere ruimte tusschen de gewone typen pijp tabak geeft aan de ophooping het meerder voordeel dat kruiscultivatie met de paarde-schop gedaan kan worden. Sigarette en sigaar tabaksoorten behooren, echter, veel dichter op elkander in de rij geplant te worden en, hoewel op een nieuwe plek de planter de beste afstanden moet bepalen door ondervinding, kan algemeen geconstateerd worden dat goede resultaten verzekerd moeten worden liever door de planten dik op elkaar te zetten dan ze te veel ruimte te laten. In Amerika wordt het gebruik van de paardeschop weerkaatst in een algemeene afstand tusschen de planten van drie tot drie en een halve voet voor vervaardigings typen, eene behandeling die slechts kan leiden in het geval van het fijner sigaar en sigaretten blad tot het verlies van hun kenmerkend fijnheid van vezel. De meerderheid der Cubaansche en Sumatra tabakken worden niet meer dan twaalf tot veertien duim van elkaar in de rijen geplant, hoewel eenige van de meer krachtige soorten tot twee voet van elkander geplant kunnen worden. De Turksche planten zijn betrekkelijk klein en behooren nooit te ver van elkander gezet te worden. De volgende schaal is op de Zuid Afrikaansche ondervinding gebaseerd en zal toepasselijk zijn op haast alle districten in Natal:—

Connecticut, Braziliaansch, Honduras, Burley, Medley Prior, van elkander geplant, 3vt. bij 3vt.—4840 planten per akker.

Cubaansch, Zimmer Spaansch, Sumatra, Havana, van elkander geplant, 3vt. bij 2vt.—7260 planten per akker.

Virginiaansch, Hester, Goldfinder, Warne, van elkander geplant, 3vt. bij 2½vt.—5808 planten per akker.

Turksch, van elkander geplant, 1½vt. bij 1½vt.—58,080 planten per akker.

Het werkelijk planten behoort te geschieden gedurende of na een regen. Als de dag bewolkt is kan men het werk vroeg aanvangen, maar als de voormiddag warm en droog is, behoort men met het planten te wachten tot de tweede helft van den namiddag ten einde de teere plantjes een gelegenheid te geven zich te herstellen en te vestigen in den koelen nacht. Zij zijn geschikt tot verwijdering naar het plantage wanneer de blaren de grootte van een dubbeltje bereikt hebben. Men zoeke uit die welk breede korte blaren hebben en die welke lange nauwe blaren hebben behooren verworpen te worden, want dit is een eerste vingerwijzing tot de soort van blad dat de volgroeide plant zal dragen. Voor over te planten maakt men de zaadbedding ter dege nat en dan worden de plantjes los gemaakt met een tuin vork. Men kan ze dan trekken zonder schade aan de wortels door de blaren tusschen den duim en vinger te vatten en ze in een mandje plaatsen die goed bedekt moet blijven met een nat doek. Op de landerijen aangekomen neemt men ze op met de linker hand terwijl een gaatje met een vinger van de rechter hand midden in het heuveltje of "ridge" gemaakt wordt. Zorg dat het gaatje niet te diep gemaakt wordt en dat de worteltjes niet gedrukt of opgedraaid worden, want in zulk een geval kan het plantje misschien leven maar zal nooit goed vooruitkomen. Ook is het belangrijk dat de grond goed onder om den wortel komt, want als het bij de nek hangt zal de plant spoedig wegkwijnen. Als water ter besproeiing beschikbaar is, kan het nu voordeelig aangewend worden om het gewas een vroege voorsprong te geven. Na verloop van drie of vier dagen behoort de oppervlakte om de jonge plantjes licht aangeroerd te worden om eenige korst die zich gevormd mag hebben te verbrokkelen en de tabaks fertiliseerder met de hand op elk heuveltje aangebracht.

Verplanting machines komen in algemeen gebruik nu alwaar de bebouwing op een uitegebreide schaal georganiseerd wordt. Onder andere, opent de "Bemis Transplanter" een dril, plaatst een kleine hoeveelheid van de fertiliseerder bij elk plantje, bevochtigt het met een waterstraal en ten slotte hoopt de dril weer op. De planten worden door twee personen gezeten achter op de machine nabij de oppervlakte van de grond ingezet. De capaciteit van dit heel nuttig stuk gereedschap is zoowat vijf acres per dag.

'The farmer has got to be convinced that there is money in fruit, and until he is, he will contend that his time can be more profitably spent than in pruning trees whose yield is only useful to pigs."

—*The Weekly Post*, Bloemfontein.

It is estimated that growing pigs placed on rape at about twenty-five to the acre will for two or three months require only half as much again as sty-fed animals. Pigs running out like this also tend to become stouter and healthier than when in confinement. They will live and grow on the rape without a supplement of grain, but a small addition of the latter has been found profitable. Dry sows, however, will do well on the rape alone.

Reviews.

SHEEP AND WOOL.

Australian Sheep and Wool: A Practical and Theoretical Treatise. By Alfred Hawkesworth, Lecturer in Charge of Sheep and Wool Department, Technical College, Sydney. Second Edition, 1906. Sydney: William Brooks & Co. Durban and Maritzburg: Adams and Co. 10s. 6d.; post free, 11s.

The history of farming in Natal is characterised by the number of oscillations, in practically all its branches, which have made the pursuance of agriculture often highly speculative. There is perhaps not a single considerable branch of farming of which this is not more or less true; and noticeably is it so in the case of sheep farming and the wool industry. The last great factor which influenced sheep farming in this country was, of course, the rinderpest plague of 1896, in conjunction with native sheep-stealing and the sales of large numbers of sheep after the last Boer War in connection with the repatriation of Dutch farmers. The prices of cattle, however—great changes in which were brought about by the rinderpest scourge—have remained the governing factor in our wool production. When cattle prices are high, sheep-farming is found to be less profitable than the breeding of cattle, and accordingly the wool industry suffers. Sheep prices perhaps then go up, and a reversion to sheep-farming takes place for a while, and so the oscillation goes on.

The state of our wool production may be judged from the following statement, which gives the quantities of wool produced during the years 1894-1906:—

Production of Wool, 1894-1906.

Year.	Wool Produced. lbs.
1894	1,942,352
1895	2,807,475
1896	2,085,232
1897	1,518,400
1898	1,747,159
1899	No Returns.
1900	1,773,231
1901	1,570,095
1902	2,043,160
1903	1,517,437
1904	1,367,856
1905	1,793,630
1906	1,884,615

From this there is seen to be a tendency to regain the level of pre-rinderpest days: at any rate there seems ample justification for saying that the industry is prospering—though certainly not to the extent that it should. This year, too, is said to be a record lambing season, which in itself is sufficient indication of what the Colony's possibilities in this direction are.

Sheep-farming, in common with every other branch of farming in Natal, is bound to go ahead; and there is every warrant for the prosecution and extension of the industry upon intelligent lines. There are many points to be considered. There is, for instance, the primary need for careful breeding. Climate and soil have an influence upon the constitution of the sheep, and so upon the quality of the wool, not always counted upon by sheep-farmers. Then care must be exercised in the feeding and management of the sheep. The principle of the "survival of the fittest" is true everywhere: it is the careful man, exercising every discretion and bringing his intelligence fully to bear upon the problems that confront him, that succeeds and eventually reaches the top of the tree. The third important consideration of the sheep-farmer is the clipping, grading, packing and marketing of his wool—another direction in which excellence tells.

It is attention to these important points that has placed the sheep and wool industry upon the successful basis and has brought about its development on the gigantic lines that has made Australia famous. Of all the States, Tasmania has led the way. By scientific breeding, sound judgment, carefulness, assisted by the climate, the Tasmanians have surpassed the breeders of all other countries, producing from the imported stock an all-round improved merino sheep. It is a question whether any other country can at the present time count as many high-class merino sheep as the breeders of Tasmania. In the early years of the past century the Van Dieman's Land Co. entered extensively into the pastoral industry of the island, with the object of supplying England with wool, so as to make her independent of foreign supplies. A large tract of country was secured, and thither large consignments were made from the best and purest Saxony flocks. From 1825 to 1830 that company expended £30,000 in the importation of sheep. In the year 1830 there were in the possession of the company 60,129 sheep, including lambs. Mr. W. Warrington in 1829 imported 45 rams and 100 ewes of the Electoral breed, from Saxony, as well as pure Negrettis, costing £16 18s. per head. This latter flock was kept separate, and is known as Trimmer's flock. The foundation of the Tasmanian flock was laid with the purest merino types procurable. As time advanced, so did the flocks improve, eclipsing in every minute detail the imported sheep.

In Australia the pioneers had to take what sheep they could get from the few ships calling at the ports, but with them they made a noble start. Considering the great distance from Europe, and the means of communication, the rapid advance that took place is all the more startling. It is a little above a century ago when sheep were unknown in Australia. The first importations were of such inferior types as to give one the idea that they were totally incapable of any improvement. They were thin, narrow, long-legged, flat-sided, razor-backed sheep, with covering more like hair than wool. This was a miserable foundation on which to build such a gigantic industry; and the happy results that have been brought about have been obtained by patience, perseverance, and good judgment, greatly assisted by natural causes through climate and pasture.

It is to Australia, then, that we naturally turn in seeking information and instruction in the sheep and wool industry; and it is from Australia that we expect to get the best results of studies prosecuted in this line. Farmers in South Africa will accordingly welcome the appearance of the second edition of Mr. Alfred Hawkesworth's treatise on "Australian Sheep and Wool." Mr. Hawkesworth, who is lecturer in charge of the Sheep and Wool Department of the Sydney Technical College, writes with the authority of an expert; and his advice, descriptions, and opinions constitute perhaps as complete a text-book upon the subject as could be wished, from the point of view of the student as well as from that of the selector, farmer, merchants, and others interested in the sheep and wool industries.

Commencing first with a description of the sheep from a zoological point of view, the author proceeds to enumerate the various varieties of sheep, which he classifies according to their European, Asiatic, African and American origin. Sections dealing with climate and pasturage, breeding, choice of animals, and flesh-sheep follow. Merinos, Lincolns, Leicesters, Cotswolds, North Devons, Romney Marsh sheep, Border Leicesters, Cheviots, South Downs, Shropshire Downs, Suffolk Downs, Hampshire Downs, Dorset Horns, Oxford Downs, and other types are all described and illustrated, a description of the class of wool produced by each variety rendering the accounts complete and valuable. The Angora goat, too, occupies some attention. Sections on breeding, management and judging complete the first half of the book, devoted to sheep proper.

The second half of the work deals wholly with wool, and is characterised by the thoroughness with which the author goes into the whole subject, from a preliminary account of the structure of the skin followed by a description of the nature and growth of wool to wool classing and washing, degreasing, and fellmongering, and preparing sheep-skins for market. Illustrations and descriptions are given of different types of wool; and the various properties and qualities of wool are treated of. The book is brought to a conclusion with some "hints to selectors and farmers," notes on the manufacture of wool, and statistics. We can commend this useful book to the attention of all interested in the sheep and wool industry. Messrs. Adams & Co., of Durban and Maritzburg, have imported a number of copies from Australia—where the book is published—and are selling them at 10s. 6d., post free 11s.

CO-OPERATIVE CREDIT.

Co-operative Banking: its Principles and Practice. By Henry W. Wolff. London: P. S. King & Son, 1907.

There are people who will tell you that agriculture does not "pay." They go into the "whys" and the "wherefores" of the matter and seek to convince you that "things are not as they used to be," and that the calling of agriculture is a profitless one. There is a modicum of truth in their contentions; things are, indeed, not what they used to be; and agriculture very likely does not pay—when conducted on the old lines. But the truth is that there is no calling that pays better in small hands when there is plenty of money to work with. Only, in all our callings, agriculture has been the last to recognise this all-important fact that is the rule of the present day---namely, that you must have plenty of working capital. That is the mainspring of production. But the difficulty is, in the first place, to find your capital—and, to do so, you must borrow; and, in the second place, you must, from the very nature of the conditions which surround you as a farmer, be able to obtain your money on easy terms. That is one of the difficulties which beset modern farming practice, and it is that difficulty which is recognised and is gradually being alleviated in most progressive countries of the world by the institution of agricultural and land banks, people's banks, and so on. The same difficulty, too, is recognised by the various South African Governments, and we have recently seen the introduction of Bills for the creation of Land Banks in the Legislatures of the Cape Colony, Transvaal and Natal.

One of the leading authorities of the present day on the subject of agricultural credit is undoubtedly Mr. Henry Wolff, who is well known as the author of several standard works on the subject. His "Agricultural Banks: their object and their work," and his "People's Banks: a record of social and economic success," among other works, did much to bring the subject to the attention of the English-speaking world; and his latest book, on "Co-operative Banking," forms a valuable addition to the literature of agriculture credit. In his characteristic, piquant style the author enters fully into the questions involved in the solution of the problem and into the mechanism and rationale of the co-operative credit system, the principles and practice of co-operative banking being clearly set forth. There is, in addition, a long supplementary chapter on co-operative mortgage-credit, running into 57 pages.

Co-operative banks have been before the world, Mr. Wolff tells us, just about sixty years; and no country which has adopted them now wishes to do without them. That they have proved most useful helps to social advancement and agricultural and industrial development cannot be doubted. In Germany, where they have been longest established and have become most active in business and most powerful, they now provide millions of money to turn to productive uses. It is, moreover, to the medium and small manufacturer and dealer, the artisan, the working man with the little needs of his household or his calling, the farmer and the small cultivator, that they bring longed-for and valued help. "A sovereign made available in that humble stratum," Mr. Wolff says, "doubles, trebles, quadruples itself in little time and brings relief proportionately to the largest number. And the same quantity of gold diffused in that wide stratum produces more happiness and prosperity in a nation than when lumped together with heavy gilding at high points. For a happy, well-employed and well-to-do working class necessarily means a prosperous nation. From the bottom the benefit in this application rises to the higher strata much more readily and more effectually than it is apt to filter down through the impervious lining of capitalist pockets. And so the effect of the wealth spreads out over the entire commonwealth."

The man who joins a co-operative bank joins it because he requires a loan which he is not able to obtain in other quarters except on terms which are either exceedingly onerous or else humiliating, and in consequence demoralising. All other legitimate sources of credit seem closed against him. The ordinary bank is barred to him as a credit institution; and in his hour of need he has no one to fall back upon except the charitable philanthropist, the usurer, the pawnbroker, or the tradesman. Our banking, as we have it, is, as Mr. Wolff points out, essentially *rich* men's banking, and was advisedly established to be such. It is, of course, quite true that bankers, made liberal by competition, to-day readily accept as customers comparatively small men with small balances and doing small business. Nevertheless, in the main, banking remains the wealthy man's special preserve. The explanation is simple. Credit presupposes security; it would not be legitimate without such. And there is—without co-operative banks—no security that the "poor" (using the word in its most comprehensive sense) can give, which could at all satisfy bankers. It is material possessions, a tangible, convertible pledge, or the knowledge of the existence of its equivalent, is alone what the banker requires; and it is for the people who are unable to supply just that material type of security that co-operative banking has sprung into being.

However, tangible property is not the only security which can claim credit value—nor, perhaps, Mr. Wolff thinks, even the best. A man may be effectually bound by other pledges. In Germany, among the higher classes, a man becomes ruined in social position if he fails to redeem a debt secured by an *Ehrenschein*, a promissory note for which he pledges his word of honour. Respect for him is gone, his class-mates will not look at him; if he is in the army or the public service, he forfeits all prospect of promotion, and may have to retire. He is held to have dishonoured himself. There is, as Mr. Wolff shows in the course of his book, plenty of security to pledge, only it is not of a description such as an ordinary business bank could take or be expected to take. This implies what is the main factor in the problem, the providing of some new kind of security, which small men can give, collectively if not singly, the devising of some new pledge for credit such as will serve where there is no tangible security to offer. The solution of the problem is found in the application of the co-operative principle: "the only method by which weak men can remedy their individual weakness, such as in the present case we have to postulate, is combination, the joining together of puny efforts, so as by their collective effort to produce force. . . However small may be the individual's power to give security, many small units combined may very well make up a sufficiency for moderate purposes. And once this result is brought about, additional forces may, as we shall see, be brought into play, with the effect of still further stiffening the power produced, and making the collective security go, in the end, a very considerable way."

Mr. Wolff goes fully into the machinery of co-operative banks, the ruling principle of which he lays down as a junction of forces, a sense of responsibility on the part of members, discrimination in the election of members, caution and enquiry in the granting of loans and vigilance in the control of their employment. It is only a good understanding of the principle, an intelligent application of the machinery, he remarks, which will produce good co-operative banking. Mere mechanical rule-of-thumb management must needs wreck the bank. That is the members' affair, and they should be very careful to secure good administration, for, as Leon Say reminds us *"il ne suffit pas d'avoir une bonne machine, il faut aussi avoir un bon mecanicien."*

Mr. Wolff's book is one that should be in the hands of all interested in the subject of agricultural credit, and we can honestly recommend it as a clear exposition of the principles and practice of co-operative banking which it sets out to describe and explain.

A Vision of the Future.—*South Africa* has informed its readers that Mr. Deane, Minister of Agriculture, told an interviewer that this year "the Colony will be able to export, owing to very favourable conditions, about 1,000,000 sacks of *flour,* and it was hoped that a suitable market will be found for it." This, as a very Utopian vision of the distant future, is more or less reassuring; but we fear we shall not upset the world's "flour" market to such an extent for some considerable time to come. Our wheat crop does not at present run into more than four figures in muids of grain! We presume our contemporary means that we hoped to export a million muids of *mealies.*

Natal Citrus Fruits in England.—From all accounts Natal citrus fruits are doing well in Britain and a demand for the different kinds is being created that is likely to extend with the increase of our supplies.

Readers of the *Journal* who are watching the development of this trade will be interested in the following extract from the *Western Morning News* (Plymouth), for which we are indebted to the *Natal Review*:—"The pretty mandarine oranges from Natal, which have just been put upon the London market, have attracted considerable attention. Compared with ordinary oranges mandarines are small, but the specimens from Natal are fully developed, and the finest fruits of their class that have been imported for years. These Natal mandarines will be serious competitors with the Spanish mandarines, for shippers inform us that enormous quantities will be exported from the South African Colony to the British market in coming years. All the high-class retail fruiterers have some of these novelty fruits on show, and they find them greatly appreciated by the public, who are content to pay fancy prices for them. A leading citrus fruit grower of Natal now in London states that the cultivators there can ship any quantity of the Natal mandarines to reach this country from August, and that they have made arrangements to do large business in this direction in the coming seasons. The Natal mandarine is fragrant, exceedingly pretty, and possesses a very juicy and sugary flesh. Natal oranges are also on the English markets at the present time, and much inquired for by consumers, who prefer them to the ordinary Spanish fruit. Seedless oranges from California are popular. These giant oval fruits are high-priced, chiefly on account of their size and freedom from seediness. The specimens are of magnificent quality, and add to the attractions of the windows of the retailers. In the City sale rooms at Monument Yard, London, dealers incline to the belief that the South African orange fruit importations may revolutionise the orange trade of the United Kingdom, at least as far as the summer trade is concerned." The report of Mr. White, who accompanied the first shipment of citrus fruit to England on behalf of the Natal Orchard Association, will be found in another part of this issue.

"At Vereeniging the steam plough turns over thousands of acres, and the yield increases year by year. The deep and steady cut, and the thorough stirring of the soil, are advantages which no ox-drawn ploughing can duplicate. The initial outlay is great—somewhere near £5,000—but in the North, the expenditure has been justified by the return, and no business man asks for more than that."

—*The Weekly Post*, Bloemfontein.

Experiment Farms.

CEDARA.

To Director Experiment Stations.—

The period under review dates from the 1st of August till date of writing, viz., 18th October.

The work in the various branches of this section of the Farm has proceeded satisfactorily, and field work in particular received special attention in order that ploughing, cultivating, etc., might be well in hand for the planting of crops as soon as the rains commence. Unavoidable circumstances caused us very serious delay last season in getting the crops dealt with properly, and consequently the results were not as they would have been had they been planted in season.

There was no rainfall during the month of August. On the 10th of September considerably over an inch fell; and by the end of the month on the Hill and Vlei Stations, 2·02 and 2·17 inches respectively were registered. Little over ½ an inch has fallen during the current month, though at date of writing it is heavily overcast, and there is indication of more rain. Though the month of August was cold throughout, it was warmer during September, 92 degs. being the maximum temperature registered and 36 degs. the minimum.

Up to the beginning of September and until the first rain of the season fell, the veld was extremely dry and afforded little grazing for stock. Since then it has made a good, steady growth, and now there is good grazing and the working oxen are improving in condition.

Thirty acres of mealies were planted a month ago to serve the double purpose of a trap crop for the mealie moth, and of supplying material for ensilage. This crop will, of course, be heavily infested with top grub and have to be cut early in January before the second brood of moths emerge to infest the main crop of mealies planted for grain in this district in the middle of November.

A similar trial was made on the Farm three years ago, but whether the actual result was a benefit to the main crop it is difficult to say; as I am of opinion that unless co-operation with neighbouring farmers be organised the effect cannot be satisfactorily determined. In the February, 1904, number of the *Agricultural Journal* the Government Entomologist deals with this matter.

Ground has been surveyed and allotted into three paddocks in which various crops have been, and will be, organised, with a view to the conduct of pig feeding experiments. To date, Jerusalem artichokes and ground nuts are planted and are showing up well, while later on the remaining area will be planted out with kale and beans. When the crops have matured the pigs will then be allowed to run and feed upon them. The necessary fencing has been done, and portable housing is in course of construction.

A portion of the eastern swamp has been reclaimed for the purpose of growing rice. This has involved a good deal of labour in bringing into a suitable condition, as also the formation of embankments and drains to control the water when flooding the crop.

In the vegetable garden further plantings of seeds have been made, and the earlier plantings are doing well.

At this season of the year, when implements require overhauling for cultivating and planting, it is a busy time in the workshops; consequently both the engineer and carpenter have been fully employed in a class of work I consider most useful to the students.

The farrier and bricklayer continue demonstrations fortnightly in their respective branches; with the aid of students the latter has built a manure pit and foundation and pit for a circular saw that has just been secured.

A very interesting demonstration has been made with the working of a Mole Plough, kindly lent by Colonel Sir Duncan McKenzie. The object of the implement is to mould an underground channel at the required depth to lead into the main open drain. It can be used to the best advantage by being worked on the ground requiring draining prior to the main drain being cut. A photograph of the plough has been taken, which may be of interest to readers of the *Journal*.* It is an implement not generally known in the Colony at present, but once its advantages are recognised, it will find favour with many farmers.

All the working stock are healthy, and a further lot of mules has just been received on loan from the Transport Department which will be of great service for field work. There are now 21 Persian lambs, which are all shaping well. The poultry are doing well, and the result of the incubator hatching has been very satisfactory.

ALEXANDER REID,
Farm Manager.

WEENEN.

TO DIRECTOR EXPERIMENT STATIONS.—

During the past month the chief feature has been the cleaning of the various crops and roadways. The former operation does not only mean the eradication of weeds. For instance, on a half-acre plot of imported oats growing here, there is a large percentage of barley—I should say, not less than 15 per cent.—and, as it is the intention to harvest the oats for seed, a lot of work has to be done before the crop is thoroughly cleaned, as the barley does not pipe all at the same time. This is not an isolated case; and farmers would be well compensated for the extra labour expended on thorough cleaning of the seed crop.

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* This will appear in the next issue of the *Journal.*

The two lucerne sections mentioned in my last report have been planted. The Quantities of Water Section, having received a light shower of rain soon after planting, is now well above ground, but is suffering considerably from the incessant hot north winds which are very prevalent at this time of the year.

Some 20,000 onion plants have been planted out on the truck section. One line of sugar cane (Uba) has been planted, along two sides of the paddock allotted to truck crops, also across centre of block. Being planted on the side of a road, the loss of ground will not be felt, while the benefit which will be derived from the breakwind will compensate for the extra labour entailed.

The oats on the Drainage Section have been harvested, and you will be furnished with a report at an early date.

I enclose herewith photos of the plots of Indian oat, Cape barley, barley wheat and rye of Arbruzzes.* The crops at present are very instructive in showing what can be done with a light dressing of artificial manures and judicious cultivation.

The work of refitting interior of tobacco barn is being taken in hand, so that a larger quantity of leaf may be treated at each filling.

We have had three light showers of rain during the month, totalling 1·62 inches. The maximum temperature was 93 degrees. As the natural veld is still dry and bare, I have been compelled to graze the cattle on half of the imported grass paddock, the other half being left for hay.

W. HOSKING.
Curator.

WINKEL SPRUIT.

To Director Experiment Stations.—

All hands have been extremely busy during the month of September cutting, thrashing, weighing, carting and trucking sugar cane, about 200 tons being dispatched to date.

Excellent results have been obtained from the Uba Cane Manure Section, considering it is only 19 months old and a first ratoon crop. While the Uba canes have given such excellent results, the heavier canes, such as Green Natal and Lousier are miserable failures and do not appear to be at all suited for light sandy soils. In appending results of the two seasons' cuttings it will be advisable before making comparisons to note that Plots 119, 120 and 121 had to be used as a roadway for carting the cane from the various sections during the 1906 cutting (owing to the inaccessibility of the other roadways), thus causing the ground to set very hard. Needless to state, this had a very deleterious effect upon the crop, most of the cane being stunted in growth and very thin. With care and attention during the early stages of its growth this season we should be able to bring the crop and the land back to their normal conditions, thus securing uniform results at next season's cutting. Plot 101 dressed with a light complete manure has given the best result, producing at the rate of 46 tons 125 lbs. to the acre, Plot 102, "no manure," coming next with 44½ tons to the acre. Taking the two seasons: Plots 106 and 124, dressed with superphosphate and chloride of potash, have given the best average results, viz., 38 tons 987 lbs. per acre.

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* These photos will appear in the next issue of the *Journal*.

UBA CANE MANURES.

Plots 24ft. x 145ft. = 2-25ths of an Acre.

Plots.	Manures.	Cut January, 1906.			Cut September, 1907.		
		Lbs. per Plot.	Tons per Acre.		Lbs. per Plot.	Tons per Acre.	
				lbs.			lbs.
½B	No Manure	2,612	32	1,300	4,028	50	700
101	120 lbs. Sulphate of Ammonia 60 ,, Concentrated Superphosphate 50 ,, Chloride of Potash per acre	5,797	36	462	7,370	46	125
102	No Manure	5,051	31	1,137	7 120	44	1,000
103	240 lbs. Sulphate of Ammonia 120 ,, Concentrated Superphosphate 100 ,, Chloride of Potash per acre	5,958	37	475	6,926	40	1,575
104	360 lbs. Sulphate of Ammonia 180 ,, Concentrated Superphosphate 150 ,, Chloride of Potash per acre	5,697	35	1,215	6,282	39	525
105	No Manure	5,433	33	1,912	6,250	39	125
106	120 lbs. Concentrated Superphosphate 100 ,, Chloride of Potash per acre	5,854	36	1,175	7,007	43	1,587

UBA CANE MANURES.—*Continued.*

Plots.	Manures.		Cut January, 1906.			Cut September, 1907.		
			Lbs. per Plot.	Tons per Acre.		Lbs. per Plot.	Tons per Acre.	
					lbs.			lbs.
107	240 lbs. Sulphate of Ammonia 100 ,, Chloride of Potash	per acre	4,951	30	1,987	6,226	38	1,825
108	No Manure		4,660	29	250	6,235	38	1,937
109	240 lbs. Sulphate of Ammonia 120 ,, Concentrated Superphosphate	per acre	4,781	29	1,762	6,326	39	1,075
110	120 lbs. Concentrated Superphosphate ...	per acre	4,607	28	1,587	5,997	37	962
111	No Manure		4,336	27	200	5,137	32	212
112	300 lbs. Basic Slag ...	per acre	4,515	28	437	5,605	35	62
113	300 lbs. Bone Dust ...	per acre	4,903	30	1,287	5,818	36	725
114	No Manure		3,977	24	1,712	5,303	33	287
115	200 lbs. Nitrate of Soda 120 ,, Concentrated Superphosphate 136 ,, Nitrate of Potash	per acre	5,644	35	550	5,570	34	1,625
116	240 lbs. Sulphate of Ammonia 120 ,, Concentrated Superphosphate 100 ,, Chloride of Potash 1000 ,, Lime	per acre	5,262	32	1,775	6,299	39	737
117	No Manure		4,231	26	807	4,517	28	462
118	120 lbs. Concentrated Superphosphate 1000 ,, Lime	per acre	5,653	35	662	5,692	35	1,150
½B	No Manure		2,443	30	1,075	3,220	40	500
	Total lbs.		96.373	...		116.928	...	

It will be noted from the above results that the average weight of cane from all plots from 25 months old cane in 1906 was 31¾ tons per acre, whilst from 19 months' old cane in 1907 the average weight from all plots is 38½ tons.

The results from the check section do not show any marked differences, the yields being for the two seasons practically the same. The following are the results:—

UBA CANE MANURES.

Plot 24ft. x 145ft. = 2-25ths of an Acre.

Plots.	Manures.	Cut January, 1906.			Cut September, 1907.		
		Lbs. per Plot.	Tons per Acre.		Lbs. per Plot.	Tons per Acre.	
				lbs.			lbs.
½ B	No Manure	2,300	28	1,500	3,678	45	1,950
109	Same as Plot 101	5,799	36	487	4,879	30	987
120	No Manure	4,756	29	1,450	4,478	27	1,975
121	Same as Plot 103	5,189	32	815	4,261	26	1,262
122	,, ,, 104	5,408	33	1,600	5,702	35	1,275
123	No Manure	4,450	27	1,625	4,931	30	1,637
124	Same as Plot 106	6,236	38	1,950	5,539	34	1,237
125	,, ,, 107	5,318	33	475	4,986	31	325
126	No Manure	5,310	33	375	4,699	29	737
127	Same as Plot 109	5,577	34	1,712	5,304	33	300
128	,, ,, 110	5,529	34	1,112	5,172	32	650
129	No Manure	5,004	31	550	5,275	32	1,937
130	Same as Plot 112	5,324	33	550	5,426	33	1,825
131	,, ,, 113	5,289	33	112	5,642	35	525
132	No Manure	4,680	29	500	5,645	35	562
133	Same as Plot 115	4,774	29	1,675	5,656	35	700
134	,, ,, 116	5,372	33	1,150	5,368	33	1,100
135	No Manure	3,832	23	1,900	4,810	30	125
136	Same as Plot 118	4,927	30	1,587	4,921	30	1,512
½ B	No Manure	2,450	30	1,250	2,434	30	850
	Total lbs.	97 524			98,806		

Great credit is due to the two students stationed here for the capable way in which they have handled the cane, weighing on a small platform scale and helping to load from 10 to 12 tons per day.

Nearly 4 inches of rain fell during the month. The land is in good condition for ploughing, and we hope to have two teams going in the course of a week or two as soon as the cane cutting is finished.

All stock have wintered well and are in good condition.

W. JOHANSEN,
Manager.

Laboratory Notes.

TOWARDS the end of July an examination of the Uba cane grown under Plots 101 to 118 and 119 to 136 was made at the Winkel Spruit Experiment Farm in order to ascertain the effects, if any, produced by different forms of manuring.

In conjunction with this work, the Manager of the Winkel Spruit Farm has sent in his report giving the weights of cane obtained from the various sections and the particulars of the manurial treatment which was given effect to in the individual plots.

The analysis was performed in July, and wet weather had set in before the cane was cut in September. This may have affected the juice to some extent, but there is little likelihood of any material change in the weight of the cane itself.

The canes examined were average ones taken from the two inner rows of each plot; this was considered advisable in order to avoid the risk of any influence which may have extended to the outer rows from the adjoining plots. The border plots were excluded owing to their being subject to outside influences.

After being cut, the cane was weighed, topped, re-weighed and immediately afterwards passed through the hand crushing mill. The weight of the juice so extracted was ascertained, and from it the extraction per weight of cane computed under the heading of "Per cent. of Juice by Mill." These figures, which average about 50 per cent., are given in the above columns.

The further calculations were based on this extraction, consequently they do not represent the full value of the cane when subject to the double or treble crushing of modern power mills. An approximate return of the sugar per acre by a 60, 70 or higher per cent. of extraction may, however, be calculated from these figures. The values of the normal juices, together with the weights of cane, give the relative yield of each plot and afford a basis of comparison.

AVERAGE RETURNS PER ACRE.

Plot Nos.	Unmanured.		Manured.	
	Cane. Tons	Saccharose. Lbs.	Cane. Tons	Saccharose. Lbs.
108 to 118	36·10	7,833	38·85	8,236
119 to 136	31·01	5,945	32·68	6,442
Grand Average ...	33·55	6,889	35·76	7,339

The difference in yield, taking the whole of the manured in comparison with the unmanured plots, is thus found to be in favour of the former by 2·21 tons of cane and 450 lbs. of saccharose per acre. The highest yields in the manured portions are from those plots receiving a complete manure containing Nitrogen, Phosphoric Acid and Potash. In Plot 101 the light dressing is the most effective, and in No. 122 the heavy. A comparison of the individual influences of the single manurial constituents is less satisfactory, and is insufficiently marked to give pronounced recognition.

One peculiarity may be observed in regard to the returns from the unmanured plots, as shown hereunder:—

UNMANURED PLOTS.

No.	Cane. Tons	Saccharose. Lbs.	No.	Cane. Tons	Saccharose. Lbs.
102	44·44	9,163	120	27·88	5,321
105	39·05	7,790	123	30·73	5,769
108	38·86	8,939	126	29·32	5,805
111	32·95	7,382	129	32·86	6,579
114	33·12	7,240	132	35·25	7,318
117	28·20	6,497	135	30·05	5,878

In the first section a marked decrease takes place as the cane is further removed from the one extremity of the block, in the second a ten-

RESULTS OF CANE ANALYSIS.

Number of Plot.	Weight of Cane per Acre in Tons.	Per Cent. of Juice by Mill.	Normal Juice.				Gallons Juice per Acre.	Saccharose. lbs. per Acre.	Manurial Treatment of Plot.
			Lbs. per Gallon.			Glucose Ratio.			
			Saccharose.	Glucose.	Solids, not Sugar.				
101	46·05	51	1·881	·013	·056	1·38	5,259	9,893	N.P.K. (Light).
102	44·44	52	1·771	·015	·164	1·68	5,174	9,163	No Manure.
103	40·70	48	1·958	·016	·043	1·62	4,374	8,565	N.P.K. (Medium).
104	39·23	48	1·877	·014	·114	1·28	4,217	7,916	N.P.K. (Heavy).
105	39·05	48	1·856	·010	·113	1·02	4,197	7,790	No Manure.
106	43·70	50	1·868	·011	.090	1·15	4,894	9,143	P.K.
107	38·81	51	1·935	·010	·010	1·02	4,455	8,621	N.K.
108	38·86	50	2·054	·010	·031	1·00	4,352	8,939	No Manure.
109	39·48	49	1·931	·015	·057	1·54	4,332	8,365	N.P.
110	37·43	48	1·787	·018	·129	2·00	4,023	7,189	P.
111	32·95	49	2·042	·022	·080	2·14	3,615	7,382	No Manure.
112	35·02	50	2·020	·020	·024	1·98	3,922	7,922	P. Basic Slag.
113	36·32	50	2·070	·044	·029	2·12	4,067	8,164	P. Bone Dust.
114	33·12	49	1·993	·022	·048	2·20	3,633	7,240	No Manure.
115	34·72	46	1·651	·036	·281	4·36	3,577	5,906	N.P.K. { Nitrate of Soda. Nitrate of Potash.

116	39·32	51	2·076	·044	·020	4·22	4,491	9,323	N.P.K. Lime.
117	28·20	48	2.144	·032	·017	2·98	3,030	6,497	No Manure.
118	35·51	47	2·094	·035	·010	3·34	3,736	7,823	P. Lime.
119	30·44	50	1·793	·070	·074	3·90	3,409	6,112	N.P.K. (Light).
120	27·88	46	1·853	·036	·151	1·94	2,871	5,321	No Manure.
121	26·56	49	1·699	·025	.286	1·47	2,914	4,951	N.P.K. (Medium).
122	35·56	52	1·837	·040	·143	2·17	4,141	7,608	N.P.K. (Heavy).
123	30·73	50	1·677	·037	·196	2·20	3,440	5,769	No Manure.
124	34·55	49	1·672	·036	·155	2·15	3,790	6,316	P.K.
125	31·14	48	1·875	·023	·226	1·22	3,346	6,274	N.K.
126	29·32	50	1·768	·037	·152	2·09	3,283	5,805	No Manure.
127	33·13	52	1·677	·049	·206	2·92	3,857	6,468	N.P.
128	32·29	49	1·919	·041	·180	2·13	3,543	6,800	P.
129	32·86	50	1·842	·044	·131	2·39	3,680	6,579	No Manure.
130	33·81	50	1·991	·032	·044	1·60	3,785	7,137	P. Basic Slag.
131	35·23	47	1·815	·036	·079	1·93	3,707	6,798	P. Bone Dust.
132	35·25	53	1·749	·044	·057	2·51	4,184	7,318	No Manure.
133	35·31	53	1·516	·050	·204	3·29	4,191	6,353	N.P.K. { Nitrate of Soda. Nitrate of Potash.
134	33·49	56	1·521	·033	·136	2·16	4,195	6,381	N.P.K. Lime.
135	30·05	48	1·820	·040	·060	2·19	3,230	5,878	No Manure.
136	30·67	51	1·743	·034	·162	1·95	3,503	6,116	P. Lime.

dency is shown towards the opposite conditions. This same tendency to sequence is observable in the manured plots, but is somewhat masked by the manurial treatment, or it may be that the manures have slightly distorted or modified the regularity of the order. Without fully discounting this unconformity of the soil or the influence of some condition or agency which has had an apparent effect on the cane, it is difficult to apportion the true value of each manurial constituent. There is, however, decided evidence as to the value of complete manuring with a combination of Nitrogen, Phosphoric Acid and Potash.

The report by the Manager at Winkel Spruit gives details as to the manures employed and also the returns of cane cut in 1906 and 1907 from the same stools.

My thanks are due to the Manager (Mr. Johansen) at Winkel Spruit, Mr. Dwyer, and to Messrs Harvey and Tillitson (students), who ably co-operated in the carrying out of the work in connection with the analysis of the cane. Mr. Johansen may be able to favour us with some particulars as to the thrashing of the cane, as I understand there was some different treatment accorded to specified sections of the plots, and this may have made an appreciable difference.

ALEX. PARDY, F.C.S., etc.,
Analyst.

Gardening Notes for November.

By W. J. Bell, Nurseryman, Florist and Seedsman, Maritzburg.

Regular sowings may be made for succession of dwarf Beans, Radish, Lettuce, Beet, Carrot, Tomato, Marrow, Mustard and Cress. Advantage should be taken of favourable weather for planting out Cabbages, Tomatoes, Onions, Leeks, Capsicums, Egg plants, Marrows and Cucumbers. The main sowing of Celery should be made the beginning of the month.

This is a good time to sow Leeks. Sow the seed in drills or broadcast for transplanting in well manured soil.

Cauliflower should be sown this month in the up-country districts, but not till next month in the warmer parts of the Colony. The best varieties are Early London and Autumn Giant. Brocoli is more suitable for the coldest districts, being more hardy, and should be sown this month.

Thin out any growing crops that are too crowded. This is especially necessary in the case of root crops, such as Carrot, Turnip, Beet, Radish, Onion, etc. The thinnings of Lettuce, Onion, and Beet may be used to form extra beds by planting them out in rows at the proper distance apart. The large varieties of Lettuce, such as Webb's Wonderful and Iceberg, generally make the finest heads when transplanted into rich soil, and the first-named variety will grow to an enormous size if allowed a space of two feet or so.

FLOWER GARDEN.

All kinds of tender and half-hardy flower seeds may be sown now, such as Balsam, Cockscomb, Amaranthus, Dahlia, Marigold, Heliotrope, Nasturtium, Cactus, Sunflower, Portulaca, Zinnia, etc. Where the Portulaca has been sown in previous seasons, young seedlings will be found now springing up in thousands from self-sown seed shed last autumn. These may be transplanted without any difficulty and can be used for edging sunny borders in the garden, and the more exposed to the sun the more brilliant the display will be. It does not thrive in shady, damp places. Seed may also be sown now both of the single and double varieties.

Where a permanent evergreen edging is preferred the new Shasta Daisy will be one of the best all round for winter and summer, as neither heat nor cold affects it. It is both dwarf and compact and does not spread so quickly as the old Ox-eye Daisy, and is therefore more easily kept within bounds.

When raised from seed, flowers vary considerably in size and length of stem, and quite distinct forms are often produced from one sowing.

Plant out Dahlias, Perennial Phlox, Pentstemons, Cannas, Japanese Anemones, Gladioli, Tube rose, Lily bulbs, Amaryllis, Mexican Poppies, Achilleas, Perennial Rudbeckias, Delphiniums, etc.

The Delphinium should be planted in a sheltered place with complete protection from north winds. They are seldom seen in our gardens, but in the up-country districts no garden should be complete without these beautiful perennials. Autumn is the best time to sow the seed to provide young plants for planting out in spring or early summer. The young seedlings should be picked out into small tins (old milk tins will answer the purpose), and then plant out when about six inches high without disturbing the soil, into permanent quarters, where they will spring up every season from the roots.

Chrysanthemums may be planted out this month.

Old stools should be cut down and taken up, divided into suitable sized pieces and replanted in good, rich soil. These will make good plants and will produce large sized blooms if freely disbudded.

The finest blooms are produced from cuttings struck in August and

September, and these should be ready for planting out about the end of this month.

If large show blooms are required, not more than three flowering stems should be allowed to each plant and only the centre bud on each stem must be allowed to develop. Those either under or near should be carefully rubbed off as soon as it can be done with safety, care being taken not to injure the crownbud. Immediately the buds begin to show, apply clear liquid manure twice a week and syringe the plants frequently with pure water in dry weather.

The plants from the first should be staked and each stem securely tied keeping them well apart.

The operations of budding and layering may now commence. Layering is an easy method of obtaining plants that are difficult to propagate from cuttings. Another advantage is that larger plants are at once obtained. Having selected a suitable branch, make a cut with a sharp knife on the under side just below a joint half way through and up about an inch or so. The heel thus formed must then be carefully pegged down and held fast by a stake with the branch tied in an upright position.

Where the soil is poor remove a spadeful from the spot where the layer is to be fixed and replace with some good soil. A mulch of some kind placed on the surface all round will conserve the moisture and facilitate the formation of roots. When the layers are rooted they may be cut off from the parent plant and be planted at once in tins or pots in a sheltered spot to become established before being planted out. Many varieties of Carnation that are difficult to strike from pipings may easily be propagated in this way.

Plant out in wet weather all kinds of evergreen fruit, ornamental trees, flowering plants and creepers.

This is the best season for the formation of grass lawns, either planting or sowing; or for planting new evergreen fences.

An estate of 12,000 acres, known as Inverliver, in Argyllshire, has just been purchased by the British Government for the purpose of converting it into a State forest station, at a cost of about £30,000. It is situated on the shores of Loch Awe, in one of the most sparsely populated districts of the Highlands, and is surrounded by mountains and moorland.

Correspondence.

GREEN MANURING.

A correspondent at Mt. St. Bernard writes:—

"Owing to the extremely high cost of fertilizers for manuring, local farmers have the intention to use more economical manuring, *i.e.*, green manure. Could any of the numerous readers of the *Agricultural Journal* furnish us with information as to the most advantageous crop used for green manuring. The cowpea, or lupine-pea, is considered very fertile, but it is very expensive in this country and difficult to procure; but, should the above peas be procurable, any particulars, as to the nature of same, cost, and where it could be procured, would oblige."

[Some of our readers may have seed for disposal; or we would suggest that our correspondent place himself in communication with seedsmen in Maritzburg or Durban, from whom he would be able to get full particulars as to cost.

The advantages of growing cowpeas are thus summarised by the Louisiana Experiment Station:—(1) The cowpea is a nitrogen-gatherer; (2) it shades the soil in summer, keeping it in a condition most suitable to the most rapid nitrification, and leaves it pliable and loose and in the best condition for a future crop; (3) it has a large root development, and hence pumps up from great depths and large areas of water, and with it the mineral matter needed by the plant; (4) its adaptability to all kinds of soils, stiffest clays to most porous sands, fertile alluvial bottoms to barren uplands; (5) it stands the heat and sunshine of Southern summers; (6) its rapid growth enables the farmer in the South to grow two crops a year on the same soil; (7) when sown thickly it shades the soil effectually, smothering out all weeds, and thus serves as a cleansing crop; (8) it is the best preparatory crop known to the Southern farmer: every kind of crop grows well after it; (9) it furnishes a most excellent food in large quantities for both man and animals

On heavy clay lands which need loosening, the vines should be turned under green. The heavier the crop turned under the greater will be the beneficial action on the mechanical condition of the soil. On sandy soils which are already too light the vines should be grazed and left on the surface to decay. Where the vines are ploughed under the operation should be done in the autumn, and the ground immediately followed by some winter growing crop, such as rye, wheat, winter oats or vetch. The roots of these growing plants catch and hold the foods liberated by the decaying vegetable matter in the soil and thus prevent winter leaching and washing. The following spring the green cover crop can be ploughed under and the regular crop of mealies or small grain grown. Where it is not practicable to grow this winter cover crop it is best in practice to let the vines lie on the ground over winter. This prevents the washing and leaching of the soil that would occur on freshly ploughed ground.

Two classes of plants are used for green manuring: those that gather nitrogen from them and in decaying add this valuable plant food to the soil, and those that cannot gather atmospheric nitrogen but simply utilise that already in the soil. The first class is by far the more valuable. It is composed of the leguminous plants such as lucerne, clover, crimson clover, cowpeas, velvet beans, soy beans, vetches, etc. To the second class belong such crops as buckwheat, rye, mustard, etc. According to the "Farmers' Cyclopaedia of Agriculture," a good crop of lucerne, crimson or red clover, cowpeas or velvet beans, will contain about 150lbs. of nitrogen, a large proportion of which is obtained from the air.

Green manures add no mineral matter to the soil other than that taken from it. They do, however, bring up such foods from the subsoil and store them in the leaves, stems, and upper portions of the plant. When the crop is ploughed under these materials accumulate in the surface soil, and thus become more available for succeeding crops. Such plants as rye, buckwheat and mustard add nothing to the soil on which they grow except humus. This, however, is of great value in the improvement of the physical condition of the soil, and for this purpose they may be used until the clovers or some other leguminous plants can be grown.

In selecting a crop to sow for bringing up worn-out or naturally poor soil, attention should be paid to its suitability for the soil, climate, and any particular local conditions. For instance, a plant requiring considerable warmth and sunlight, as the cowpea, should not be used as a cover crop in an old orchard affording much shade. For this purpose Canada field peas or clover would do better. In soils lacking lime (when lime is not easily obtainable) a plant capable of withstanding considerable acidity, such as the cowpea or lupine, should be chosen rather than clover or lucerne. In heavy clay soils holding much moisture, red clover or alsike clover will often succeed, though lucerne cannot possibly make a stand.]

The Missouri farmer who neglects to cut his thistles before going to seed is subject to a fine of 10 dols. The overseer of highways is authorised to cut thistles and other noxious weeds and charge the same against the land.

Animal Diseases in September.

EAST COAST FEVER.

East Coast Fever occupies a secondary place in the monthly report of the Principal Veterinary Surgeon (Mr. S. B. Woollatt) for September. In the Vryheid and Ngotshe districts, Mr. Woollatt reports, there were 15 fresh outbreaks; in the Babanango district there was one—the first to appear in this Magisterial Division, although on three sides the district has been surrounded by infection up to its actual borders for some time past; in the Dundee and Umsinga districts there were two outbreaks—that in the Umsinga district occurring in the Native Location, about twelve miles from the original centre of infection on the Sunday's River. The deaths during the month from East Coast Fever were as follows:—Lower Tugela and Mapumulo, 862; Wessel's Nek, 35; Umvoti County, 3; Durban County, 75; Muden, 1; Utrecht, 10; Dundee and Umsinga, 70; Inanda, 26; Vryheid, Ngotshe and Babanango, 700.

Large numbers of cattle have been removed for slaughter from these several infected districts, and the Compulsory Fencing Act has been in operation in the districts of Dundee, Ladysmith and Durban County. The branding of cattle is also still being proceeded with in Vryheid, Dundee and Durban County.

LUNGSICKNESS.

One fresh outbreak occurred in the Krantzkop district in a troop of cattle in contact with the original outbreak in this district. One animal only was affected, which has been destroyed, and the rest inoculated. In Alfred County another fresh outbreak has occurred, and another occurred at the beginning of the present month (October), making a total of three outbreaks. The amended Act has been put into operation; and, in so far as Alfred County is concerned, cattle have been prohibited from entering the rest of Natal, except for slaughter.

"Some months back," remarks Mr. Woollatt, "owing to the prevalence of lungsickness in the Cape Colony, it was considered necessary to prohibit cattle from that Colony entering Natal, but as previous to this arrangements had been come to with the Cape authorities with reference to Alfred County, in connection with East Coast Fever, making the Umzimkulu River the boundary line, to permit cattle transport between the Cape and Alfred County, cattle were not prohibited from entering Alfred County from the Cape under the Lungsickness Regulations; and before this County was excluded the public there, and their committees, were asked if they wished to be shut off from the Cape Colony, which they declined.

"Our action in prohibiting cattle from entering Natal from the Cape has been justified by the outbreaks which have occurred in Alfred County, where movement is still being permitted, and where, there is no doubt, the infection came from the Cape Colony."

SCAB.

During the month there were 14 fresh outbreaks of scab; and 22 licenses were raised.

The bulk of Mr. Woollatt's monthly report is taken up with remarks on this disease. Mr. Woollatt says:—

"At the present time the several Colonies have legislation dealing with Sheep Scab, all more or less on different lines, and yet the one Colony—this particularly applies to Natal—is very largely dependent on the other for winter and summer grazing for sheep, which necessitates a bi-annual trekking. This trekking of sheep is a practice which we cannot hope to dispense with—at least for some years to come—and must, therefore, be recognised as a feature of sheep farming in many districts—and while we recognise this trekking of sheep I think we should also frame our laws as to deal in the most stringent manner with actual outbreaks of scab, and give all the freedom possible in the movement of sheep from one Colony to another.

"Under the present system of each Colony having a separate Scab Act, we find that individual Colonies impose more or less stringent restrictions at their borders with a view to guarding against the introduction of diseased sheep, which must continue in force until a Scab Act, universally administered, is in force. The necessity for a universal Scab Act is brought home to everyone who knows the conditions which exist on the borders—particularly in the cases of Natal, O.R.Colony and Transvaal, where the border line is, in most cases, imaginary, and movement across the border frequently only constitutes a movement from one farm to another.

"The Scab Act of Natal, which was made Law in 1887, recognises this winter and summer trekking, and made special provisions for dealing with it, which, in my opinion, would have been perfectly justified had proper Scab Acts been in existence in the Colonies from which the sheep were coming to us; but as in the past satisfactory legislation did not exist, these special provisions were the means of bringing numbers of infected flocks into Natal annually from the old Free State. Doubtless infected flocks also returned from Natal. As proof of this, prior to the recent legislation introduced in the O.R.Colony against sheep scab, the returns for scab in the Northern Districts, which occurred among sheep running there during the winter months, showed a high percentage to be infected, and since the enforcement of the O.R.Colony's Act these outbreaks have been reduced by fully 75 per cent. The Transvaal returns show 800 outbreaks and the O.R. Colony 550 existing at present.

This reduction in the amount of scab in these districts must, I think, be accepted as ample proof of the number of infected flocks which used previously to be brought into Natal from the O.R. Colony, which was largely brought about by the provision in the O.R. Colony's Act requiring simultaneous dipping in the autumn, just prior to the sheep entering Natal. We still have to contend, however, with the fact of many of the passes in the Berg and the routes the sheep travel along being grossly infected with scab, and for this reason we should stringently enforce the dipping on arrival at their destination in Natal.

"It was ruled by the Law Department that, under the Act of 1887, a flock of sheep actually affected with scab could enter under Section 20, and we had no power to stop it. We could, of course, prosecute the owner for travelling scabby sheep, but he could still proceed to his destination.

"As regards the Natal Act, it does not provide for the dipping of sheep to be carried out by a Stock Inspector if the owner fails to clean his flock himself. If such provisions existed, as it does in the laws of some of the neighbouring States, we could deal in a much more satisfactory manner with the outbreaks in Native locations, where numbers of flocks, often consisting of from ten to twenty sheep, are grossly infected, and will continue to be infected while they are allowed to run on infected pastures and kraals, no matter if they are dipped in accordance with the license or not.

"If we possessed the powers above referred to we could send a man in these localities with portable dips to carry out a systematic dipping for a prolonged period at the owners' expense, which must be recognised as the only possible way of eradicating from such localities, short of prohibiting the keeping of sheep. The same applies to many farms where the veld, kraals, etc., are so infected that, short of this practice or the prohibition to keep sheep for a definite period, outbreaks will still continue to crop up. This also applies to those sheep constantly shown as being under license. The Scab Act makes no provisions for the disinfection of premises or kraals, but under the Contagious Diseases Act of 1894, we have certain powers in this direction, but it is not practicable to disinfect kraals or pastures which are as great a factor in the dissemination of sheep scab as the sheep themselves. Further, those who have had experience of the working of the Scab Act know that, if an owner complies with the conditions of the license and after its expiration the Inspector is unable to certify that his sheep are scabby, he must release them, although such Inspector may know that his premises are infected, with a result that it is only a matter of time before fresh cases crop up, unless the owner can be prevailed upon to place his sheep on clean pasture after dipping, which cannot always be carried out, as there are many cases where the whole of the farm is infected. In such cases where the whole of the farm is infected we must either have power to dip periodically—scab or no scab—or the sheep will have to be removed from such a farm for a definite period. Under the existing Act the owner of sheep may have scab for six months at a cost of £8 only, in the way of 2nd and 3rd licenses, whereas in some of the neighbouring Colonies the Scab Acts provide for a fine on each sheep infected with scab after an opportunity has been given to the owner to clean them.

"We can understand those individuals living in districts in the Colony in which no winter or summer trekking takes place being struck with the fact that some districts always appear to show a far greater number of scabby flocks than others, but this does not, as is implied, mean that the Stock Inspector in the one district is a more able or energetic man than the official in the other. This condition of affairs will, however, always exist while we have this trekking of sheep and Native sheep owners.

"Speaking generally, the eradication of scab in any one Colony is a South African question. It would be futile for any one Colony to incur the expense necessary to attempt to ensure the eradication of scab and maintain a clean bill, unless the other Colonies took the same action; and to ensure unanimous action in as perfect a manner as possible it would necessitate one administration, as, no matter what restrictions we placed on our borders, our borders are such as will permit sheep being brought over without passing through a port of entry or without being inspected, and when we see the neighbouring Colonies are infected with scab—probably to a much greater extent than we—this fact must be realised.

"Sheep scab is a disease which can be eradicated if proper measures are taken and stringently enforced. It is not a question of the success in dealing with sheep scab being in direct proportion to the amount of money spent on it, but in direct proportion to the support which is given by each sheep owner. According to the reports from the Cape Colony, £80,000 a year is spent on sheep scab; and, as far as I can gather from the report of the Chief Scab Inspector, notwithstanding this amount the chief success obtained is in those districts where the farming community recognise the policy of doing all they can to eradicate the disease from their own flocks. . . .

"The Natal Act makes no provision for any special dips to be used, this being left entirely to the discretion of the owner of the sheep. This is right probably in the case of men who make a real effort to clean their flocks, but we know from experience that there are many who make a farce of dipping to be able to say they have dipped and thus escape the prosecution for not complying with the conditions of the license.

"Inspectors have instructions to personally inspect the dipping whenever possible, but in this connection experience has shown that many owners have so arranged things as to render inspection impossible, unless the Inspectors could visit every day during the time in which the Law requires the dipping to take place. At the present time, in those sheep districts infected with East Coast Fever, the Stock Inspector's duties are particularly heavy, and there is no doubt that the amount of time it is desirable to give to the administration of the Scab Act cannot be given."

GLANDERS.

Eight animals which reacted to the mallein test were destroyed, three in Durban, one in Dundee, and four in Vryheid. One clinical case occurred in Vryheid district.

IMPORTATIONS OF STOCK BY SEA.

During September there were imported into the Colony by sea, 3 horses, 68 sheep, 100 pigs, and 8 dogs. The horses and dogs came from England; the sheep were in transit from Australia to Nairobi; and the pigs, which were for slaughter purposes, came from Cape Colony.

Crop Reports for September.

According to our reports, the weather conditions in most parts of the Colony during the month of September were good. Several of our correspondents, in fact, consider that last month was the most favourable experienced by farmers for years. The rainfall, as far as most of our reports show, was sufficient.

In several districts ploughing is now in full swing; though on many farms agricultural operations have been delayed owing to the rush to deliver mealies early for export. The indications are that more land will be put under mealies this season on account of the favourable prospects of the newly-organised mealie export trade. Our correspondent at Kambula (Vryheid) estimates that, in his immediate neighbourhood, quite 25 per cent. more land altogether will be brought under cultivation this year than last; and he considers that the acreage under potatoes will be 50 per cent. greater than last year. He adds that fertilizers are being more extensively used in his district than hitherto.

This year appears to be a good one for fruit. The indications of good prospects contained in the August reports are strengthened by the September reports, a large number of our correspondents commenting upon the promise of a good crop.

There is not much to note concerning the wattle bark conditions; except to say that, according to our Wartburg correspondent, a lot of new ground is being broken up in his district for wattle-growing.

The forage and wheat crops appear to be doing well; and the prospects of the early mealie crop in many districts are reported to be good.

The apparent change for the better in the live stock market alluded to in our last issue is more evident from the reports for September. Our Pinetown, Mid-Illovo, Creighton, Dingley Dell, Wartburg, Colenso, Winterton, and Newcastle correspondents report more or less favourably upon the conditions in their respective districts. That the lambing season is an excellent one in most districts of the Colony is undoubted; several of our correspondents consider it a record season. Prices of eggs and poultry show, on the whole, a slight improvement upon those of the previous month, though the upward tendency is more noticeable in the prices of poultry than in those of eggs. Prices for milk and butter remain, generally speaking, good.

South African Markets.

THE prices for live stock and animal and vegetable produce, realised on the Maritzburg, Durban, Johannesburg and other South African markets during the month of September-October, have averaged as follows:—

NATAL.

PIETERMARITZBURG.

The Market Master has furnished the following prices realised on the Maritzburg market during the month:—

Live Stock.—Donkeys, £8 8s; fowls, 2s; ducks, 2s 6d; turkeys: cocks 10s, hens 6s; guinea-fowls, 2s 9d; rabbits, 1s 6d.

Animal Produce.—Bacon, 7d per ℔; pork, 5d per ℔; ham, 9d per ℔; eggs, 10d per dozen; butter, 1s 4d per ℔; cheese, 9d per ℔; honey, 6d per ℔; hides, 7d per ℔; lard, 8d per ℔; beef, 5d per ℔; mutton, 7d per ℔.

Vegetable Produce.—Buckwheat, 15s per muid; beans, 21s per muid; earth nuts, 10s 6d per muid; Japanese millet (grain), 5s per 100 ℔s; Kafir corn, 11s 6d per muid; mealies, 9s per muid; hay, 20s per ton; onions, 12s per 100 ℔s; peas, 21s per 100 ℔s; potatoes, 5s per 100 ℔s; sunflower seeds, 6s 6d per 100 ℔s; sweet potatoes, 2s 6d per muid; amadumbe, 4s 6d per muid; barley, £1 10s per ton; oats, £1 per ton; bananas, 1s 6d per 100; oranges, 2s per 100; naartjes, 2s per 100; lemons, 1s per 100.

DURBAN.

The Market Master reports the following average prices realised during the month ended 12th October:—

Live Stock.—Sucking pigs, 5s 6d; fowls, 2s 1d; ducks, 3s; guinea-fowls, 3s 3d; rabbits, 1s 3d.

Animal Produce.—Butter, 1s 3d per ℔; eggs, 1s per dozen; pork, 4d per ℔.

Vegetable Produce.—Amadumbe, 3s per muid; Kafir corn, 10s per muid; mealies, 8s 3d per muid; earth nuts, 12s 6d per muid; potatoes, 8s per muid; sweet potatoes, 2s 6d per muid; turnips, £3 per ton.

TRANSVAAL.

JOHANNESBURG.

Mr. Alfred Webb, produce agent, P.O. Box 2342, Johannesburg, representing the farmers' co-operative associations of the Cape Colony, has furnished the following prices realised on the Johannesburg market during the week ended 17th October:—

Market Prices.

Live Stock.—Oxen: slaughter £9 to £16 10s each, dressed £2 to £2 4s per 100 ℔; cows (milk), £15 to £35; sheep: slaughter hamels 17s 6d to 23s each, dressed 5d to 5½d per ℔; pigs, 3½d per ℔ live weight; donkeys, £6 to £9; mules, £15 to £22; fowls, 2s to 3s; ducks, 2s 6d to 3s 6d; geese, 5s 6d to 6s; turkeys: cocks 9s to 12s 6d, hens 5s to 7s.

Animal Produce.—Butter, 1s per ℔; eggs: new laid 1s 6d to 1s 9d, fresh 1s to 1s 3d, per dozen.

Vegetable Produce.—Bran, 7s to 10s per bag of 100 ℔s net; beans (dry) 10s to £2 4s per bag of 200 ℔s net; chaff, 3s to 3s 6d per 100 ℔s; forage, 3s 6d to 7s per 100 ℔s; Kafir corn, 11s to 13s per bag of 200 ℔s net; lucerne, dry, 5s 6d to 6s 3d per 100 ℔s; manna, 2s 6d to 3s per 100 ℔s; mealies, 8s to 8s 9d per bag of 200 ℔s net; onions, 18s to £1 2s per bag of 120 ℔s net; oats (seed), 8s to 11s per bag of 130 ℔s net; peas (dry), 16s to £1 5s per bag of 200 ℔s net; potatoes, per bag of 160 ℔s net: 10s to 18s, medium, 6s to 9s 6d; sweet potatoes, 5s to 9s per bag of 120 ℔s net; turnips, 2s to 3s per bag; bananas, 1s 6d to 3s per 100; lemons, 2s 6d to 4s per 100; naartjes, 3s to 5s per 100; oranges, 3s to 7s per 100; pineapples, 2s to 3s per dozen.

Notes.

Mr. Webb also contributes the following notes on the Johannesburg produce and live stock market:—

Live Stock.—Prime beef is in good demand at highest rates with a somewhat limited supply. Mutton is cheaper in every class, and tip-top quality is sold to-day at prices that would have been laughed at a few months back. It daily becomes more apparent that the country is growing sufficient produce and stock to supply its own wants, or at any rate nearly so, and, unless some oversea outlet is found for the surplus, and discouragement given to oversea importations, the South African producer will have to be satisfied with prices even a great deal lower than he is getting to-day.

Poultry.—A considerable trade continues in this department of the morning market, and suppliers should be more satisfied with to-day's prices. Farmers should watch this section from now onwards, and take advantage of improved values as Christmas approaches.

Butter.—Fresh farm butter is beginning to make an appearance, and a big local demand exists for this quality. Good prices can be obtained, and even the smallest consignments can be placed to advantage. Correspondence in this section is particularly invited.

Eggs.—Fresh eggs are still coming forward in large quantities, and, in the obsence of the imported article, prices remain firm at rates quoted. New laid eggs are improving in price.

Mealies.—Prices are steady at current quotations, and fair parcels change hands daily. Hickory Kings are in great request and fetch top prices, consignments being placed out of hand without difficulty and thus saving market dues, cartage, etc.

Kafir Corn of good quality, both red and white, finds a ready sale, and larger quantities can be absorbed.

Manna.—This article always finds a ready market, even if of very poor quality, and it should pay farmers to grow larger quantities. The seed can be purchased locally at a moderate price.

Potatoes.—It has been a bad year for potato growers, and prices still remain unremunerative. Hundreds of bags of old potatoes come on to the market daily, and new season's are beginning to arrive to make values still worse for old stocks. New season's are bought up quickly at excellent prices, and consignments of these can be forwarded.

Peas and Beans are very firm at highest rates for best sorts, and prices show an upward tendency. More Sugar and Rangoon beans should be grown for this market, instead of the many Kafir varieties now sent forward. I should always be pleased to post samples of the sorts that are mostly in demand.

Forage.—Average values are much lower for this article, and as the new season's crops from the Western Transvaal are arriving in larger quantities (and of excellent quality) prices will probably weaken still further.

Lucerne.—Dry pressed is suffering from competition with cheap oathay, and, as the Colonial crop is almost due, I anticipate a considerable fall in values before Christmas. Farmers should remember that in this market green-coloured lucerne is always preferred to brown-coloured, and fetches a higher price. In articles such as lucerne, oathay, etc., it is advisable to forward in short trucks in preference to bogies, as being more easily regulated at this end in case of an adverse market.

Fruit.—This section is poorly supplied, and much better financial results would attend consignments if senders would study the peculiarities of this market. The public here likes its fruit large and of good appearance, irrespective of quality. Apart from this fact certain details of packing, etc., should be adhered to in order to get the best prices. Correspondents can obtain full particulars upon application.

CAPE COLONY.

The following information has been compiled from the last available report of the Cape Superintendent of Agricultural Co-operation (for the week ended 12th October), appearing in the *Cape Times*:—

Live Stock.—Prime slaughter oxen, 37s 6d to 38s 6d per 100 ℔s dressed weight, Maitland; sheep, from 52 ℔s to 56 ℔s dressed weight, 21s to 22s 6d; fowls: small 1s 3d to 1s 6d, medium 1s 6d to 2s, large 2s 3d to 3s 3d; ducks, 2s 11d to 3s 6d each; turkeys: hens 4s to 6s 6d, cocks 5s 9d to 10s 6d; geese, 3s 6d to 4s 9d.

Animal Produce.—Colonial butter, best: 1s 4½d wholesale, 1s 9d retail; Colonial Cheddar cheese, 9d to 10½d per ℔ delivered Capetown; Colonial Camembert cheese, 9s per dozen; Colonial National cream cheese, 4s 6d per dozen; eggs: fresh 8s to 8s 6d per 100, not guaranteed 7s to 7s 6d per 100; ostrich eggs, 9d to 1s each.

Vegetable Produce.—During the week under review the Australian wheat market continued to advance steadily and local prices rose in sympathy. Inquiries for new season's crops of lucerne were numerous, and the prices for this hay must consequently come down. Sales in this item have been very small for some time, owing partly to the low prices quoted for oathay. Rye and mealies advanced slightly, while bran receded a few pence. The following prices are recorded in respect of the week under review:—

Colonial wheat, per 200 ℔.—Caledon 1st, 19s 9d to 20s; Malmesbury, 21s to 21s 6d; Moorreesburg, 21s to 21s 6d; Porterville-road, 21s to 21s 9d.

Colonial oats, per 150 ℔.—Caledon 1st, 5s 9d to 6s; 2nds, 5s 3d to 5s 6d; Moorreesburg, 6s 6d to 6s 9d; Malmesbury, 6s 6d to 6s 9d; Main Line, 7s 3d to 7s 6d.

Colonial barley, per 150 ℔.—Moorreesburg, 8s to 8s 6d; Main Line, 8s 3d to 8s 9d; Caledon, 7s 9d to 8s.

Colonial rye, per 200 ℔.—Country stations, 17s 6d to 17s 9d; *ex* Stores, Capetown, 17s 9d to 18s.

Kafir corn, per 200 ℔.—Red, 12s 9d to 13s; white, 12s 6d to 12s 9d., *ex* Stores, Capetown.

Bran, per 100 ℔.—5s 3d to 5s 6d, *ex* Stores, Capetown.

Mealies, per 200 ℔, delivered Capetown.—Natal yellows, 11s 6d to 11s 9d; O.R.C. small yellows, 13s 6d to 13s 9d; Natal white coast, 11s 9d to 12s; Eastern Province Germans, 12s 9d to 13s; Eastern Province mixed, 11s 6d to 11s 9d.

Forage, per 100 ℔.—Colonial lucerne hay: 5s to 5s 3d. Colonial oathay, 4s to 4s 1d, main line stations; 3s 6d to 3s 8d, Moorreesburg and Malmesbury. Colonial fodder: 5s 6d to 5s 9d *ex* Stores, Capetown. Colonial compressed chaff: 1s 9d to 1s 10d; main line stations, 1s 7d to 1s 8d, Moorreesburg and Malmesbury.

Vegetables and fruit.—Potatoes: 1st quality 4s 6d to 6s 6d per bag, 2nd quality 3s 6d per bag, new 8s 6d to 10s 6d per bag; sweet potatoes, 4s to 6s 6d per bag; onions: new season's 4s per 100 bunches, good quality 16s to 20s per bag, 2nd quality 8s to 12s 6d per bag; green peas (fresh), 1s 6d to 3s per bag; beans (Natal and sugar), 35s to 40s per bag; bananas: choicest 22s to 24s per case of 800 to 1,000; 2nd, 14s to 20s per case; pineapples, E.P., 1s 9d to 2s 6d per dozen; oranges: small 2s 6d to 3s 6d per 100, medium 4s to 6s per 100, large 6s 6d to 13s per 100; naartjes, 2s to 9s per 100; limes, 2s to 4s per 100 ℔s.

ORANGE RIVER COLONY.

Bloemfontein.

The Bloemfontein *Weekly Post* of the 15th October publishes the following prices realised on the Bloemfontein market:—

Live Stock and Animal Produce.—Fowls, 2s to 2s 6d; fowls, dressed, 2s 3d to 3s; ducks, 2s 6d to 3s; geese, 5s to 6s; turkeys, 5s to 10s; eggs, 1s to 1s 3d per dozen; butter, 1s to 2s ℔; mutton, per hind quarter, 4s 6d to 5s 6d; mutton, per fore quarter, 3s to 4s; pork, 4d to 6d per ℔; beef, 4d to 6d per ℔.

Kimberley.

Messrs. Jas. Lawrence & Co., Ltd., P.O. Box 301, Kimberley, supply the following report dated the 18th October:—

Since our last report there has been a considerable advance in imported and Colonial meals, and there is no likelihood of prices receding before the new crop is reaped. Mealies are slightly firmer. Good white Kafir corn inquired for. Onions have declined in value owing to arrival of several consignments. Potatoes are a glut in the market; prices very low except for first-class samples. Eggs easier. Fresh butter in demand. Fat poultry finds ready sale. Good supply of fresh vegetables. Both oranges and naartjes are easier. Prime slaughter oxen in demand. Large stocks of small stock held locally. No demand for pigs.

Live Stock.—Oxen (good) prime, 600 ℔s upwards, £10 to £15; cows (good), 450 ℔s upwards, £5 10s to £8; calves, 5½d per ℔ dead weight; pigs, 100 ℔s (clean), 3d to 3½d per ℔ live weight; lambs, 30 ℔s, 13s to 14s 6d; hamels, 40 ℔s, to 45 ℔s, 16s to 20s; Cape sheep (good), 16s to 20s; rapaters, 16s to 20s; oxen, trek, £7 to £8; riding horses, £10 10s to £27 10s; draught horses, £10 to £25; mares, £10 to £25; fowls, 1s 6d to 2s 9d; ducks, 2s 9d to 3s 6d; turkeys, 7s to 15s.

Animal Produce.—Butter fresh 1s 2d to 1s 6d per ℔, second quality 10d to 1s 1d per ℔; eggs, 9d to 11d per dozen; hams and bacon, 5d to 8d per ℔.

Vegetable Produce.—Bran, 7s to 7s 6d per bag of 100 ℔s; barley, 7s 6d to 12s 6d per bag of 163 ℔s; forage: good 6s to 6s 6d, inferior 3s 6d to 4s 6d per 100 ℔s; Kafir corn: South African mixed 8s 6d to 10s 6d, white 10s 6d to 14s; mealies: Colonial yellow 8s 6d to 10s per 203 ℔s, Colonial white (hard) 8s to 9s 6d per 203 ℔s, mixed 7s to 9s per 203 ℔s; mealie meal: O.R.C. 9s 6d to 10s 6d per 183 ℔s, white 10s to 11s 6d per 183 ℔s; Cape oats, 10s 6d to 11s 6d per bag of 150 ℔s; lucerne hay, 4s 6d to 5s per 100 ℔s; wheat, 17s to 20s per bag of 203 ℔s; beans: sugar 30s to 40s per bag of 203 ℔s, Kafir 10s to 13s per bag of 203 ℔s; chaff: Colonial 6s 6d to 12s 6d per bale, Colonial pressed 3s 3d to 4s per 100 ℔s; Boer meal (Col.): unsifted 22s to 23s 6d, sifted 25s to 27s; onions, 18s to 25s per bag of 120 ℔s; potatoes, 3s to 8s; tobacco: good 4d to 7d, inferior 2d per ℔; oranges, 3s 6d to 6s per 100; lemons, 2s to 3s 6d per 100; naartjes, 2s to 4s per 100; pineapples, 1s 6d to 2s 6d per dozen; dried peaches, 2d to 6d per ℔; dried apricots, 2d to 5d per ℔.

WOOL, MOHAIR, ETC.

Messrs W. Dunn & Co., Durban, in the course of their report on wool, mohair, etc., give the following prices:—

Wool.

Newcastle District.

Long fine clean, 12 months, 8½d to 9d; ordinary ditto, 7¼d to 7½d; fine clean, 9 months, 8d to 8¾d; short ditto, 7½d to 7¾d; heavy faulty, 5½d to 6d.

Vryheid District.

Superior long line, 12 months, 7½d to 8½d; good long ditto, 7d to 7¼d; ordinary ditto, 6¼d to 6½d; poorer lots, 5½d to 6d.

Harrismith and Vrede District.

Good light, 12 months, 7½d to 8¼d; average length ditto, 6½d to 7d; short clean, 6-9 months, 6½d to 7d; heavy inferior, 12 months, 6d to 6½d; earthy heavy, 5½d to 5¾d; average fair ditto, 6d to 6¼d.

NATIVE WOOLS.

Basutoland, 6½d to 7¼d; E. Griqualand, 7d to 8¼d.

MOHAIR.

The market for this staple remains quiet, and the only business done this week was in Long Fine Blue mohair, which was sold at prices ranging from 12½d to 13d. Short mixed is still neglected.

We quote: Superior long sorted O.R.C. and Transvaal, 13d to 13½d; fair average, 11½d to 12d; mixed, 10½d to 11d; coloured and kempy, 7d to 8½d.

HIDES AND SKINS.

Hides.—Superior sun dried, 7d to 7½d; damaged, 6d to 6½d; salted, 6½d to 6¾d.

Sheep Skins.—Sound skins are quoted at 6½d to 7d; damaged, 4d; average, 5½d to 6d; mixed parcels; 4½d to 5½d.

Goat Skins.—Sound skins, 5d to 6d; average, 4d to 5d.

Angora Skins.—Sound, 5d to 6d; damaged, 2½d.

The Oversea Maize Market.

THE POSITION IN SEPTEMBER.

THE following information regarding the oversea maize market has been compiled from *Beerbohm's Evening Corn Trade List*:—

WEEK ENDED SEPTEMBER 6TH.

During this week there was a further decided advance of 9d. to 1s. per quarter in maize values, with an active demand. The sudden cessation of the Roumanian shipments, and the very unfavourable crop reports from that country and from South Russia, as well as the poor prospects in America, led to quite an active speculative demand, and La Plata for October shipment made 25s. 9d., whilst Novorossisk steamer, October, realised 26s. 6d. per 492 ℔.

The latest reports to hand from Roumania described the condition of the crop as very bad, and it was considered probable that it is only the unsatisfactory political conditions of the country which prevent the Government from prohibiting exports, the same being the case in Bulgaria. It is very likely, therefore, that, with the very moderate supplies to be expected from Argentina, the world's shipments of maize may now remain quite moderate, or even small, until the new American crop begins to move next January. The present outlook for that crop is far from favourable, and cheap sellers of new crop for January shipment, usually so numerous at this period, with a good crop promise, are conspicuous by their absence. At this date last year, parcels of new crop for London could have been bought at 19s. 9d. c.i.f.

The maize market was very slow to move during the

WEEK ENDED SEPTEMBER 13TH,

notwithstanding very moderate shipments and very unfavourable crop reports from Roumania and Russia, and an officially indicated shortage in the American crop of 50 million quarters compared with last year, and of 24 million quarters compared with 1905. Recent supplies in the United Kingdom were very large, amounting to over 300,000 quarters per week for ten weeks; and as prices somewhat unexpectedly reached a comparatively high level, consumers are disposed to use up their accumulated stocks. With the probability, however, of short crops in both America and Roumania this year, and with what seems likely to prove a dear season for wheat, the possibilities are greatly in favour of a decidedly high level of prices also for maize.

After some slight giving way in prices, the market during the

WEEK ENDED SEPTEMBER 20TH

again became firm, with a better demand, and prices were rather higher on the week: 25s. 6d. was paid for La Plata steamer afloat, and 25s. 9d. for October-November shipment, whilst 25s. 9d. per 480 lbs. was made for a steamer of Dan.-Gal.-Fox, 15th September-October shipment. Thanks to fairly large shipments from Argentine and Russia, the exports to Europe maintained a good rate; for five weeks the shipments had averaged 280,000 quarters per week for the United Kingdom and 160,000 quarters for the Continent, against 195,000 quarters and 210,000 quarters respectively in the corresponding weeks last year. Roumania, however, has practically ceased to offer, and very little will be forthcoming from America until next year, so that for some time to come the Argentine will be the chief source of supply. Since the beginning of the present Argentina season (May 1st) the La Plata shipments show a falling off compared with last year of over 50 per cent., and during the remainder of the season, viz., until next May, there will probably be an even greater deficiency compared with last year, because the high prices have naturally attracted supplies earlier than otherwise would have been the case. Last year, in the 33 weeks from September 19th to April 30th, the La Plata shipments averaged 150,000 qrs. per week; in the previous year they were 100,000 qrs., and in 1904 they reached 175,000 qrs. This season they will probably not reach 50,000 qrs. weekly for this period.

"With regard to the Roumanian crop," the *Corn Trade List* remarks, "the reports remain very unfavourable, and are almost equally so from America, as is evidenced by the fact that Iowa, the leading maize State last year with 375,000,000 bushels, expects this year to reap little more than half that quantity. The *Cincinnati Price Current* also reports that much of the maize crop is still green, and dry, warm weather is essential for maturing the crop before the frost arrives. It seems to us, therefore, that indications point to a season of high prices for maize, as well as of wheat. Meanwhile, the recent liberal supplies in the United Kingdom will probably tend to keep the market in check."

There was a decided improvement in maize values during the

WEEK ENDED SEPTEMBER 27TH,

with a good demand, notwithstanding liberal shipments to United Kingdom. The lack of offers for shipment from Roumania, in which country it is now definitely clear that the crop is more or less seriously a failure, and the growing feeling that the American crop will likewise prove to be a short one this year, have combined to create a more general desire to buy maize for forward delivery, and up to 26s. 9d. has been paid for La Plata for October-November shipment, and 27s. for a handy steamer early October shipment, whilst for Novorossisk maize, 15th October-November shipment, 27s. 1½d. has been paid.

"The possibilities of short maize supplies in the future are becoming, it would seem, more clearly defined," the *List* says: "the Argentine Republic is now practically the main source of supply, and that source may very shortly dry up. The season's shipments are, indeed, already far larger than was expected, according to the official estimate of the crop, and it is quite probable that the surplus remaining to be exported from now to next April does not reach 1,500,000qrs. as compared with 5,000,000qrs. at this date last year. Roumania has shipped during the past 12 months about 6,500,000qrs. out of a supposed surplus of 9 million quarters, and Russia 3½ million quarters out of an estimated surplus of 5 million quarters. Fair stocks of old corn therefore doubtless remain in Roumania and South Russia, but the new crop in Roumania presents the possibility of being so short this year that holders will be loth to part with what remains of their old crop. We are, indeed, assured that it is only the fear of creating a financial crisis in the country which prevents the Roumanian Government from prohibiting exports."

The condition of the American crop has, however, been attracting much attention. The September report of the Washington Bureau indicated a yield of 2,500 million bushels, against 2,900 millions last year, but subsequent conditions have been decidedly unfavourable for the maturing of the crop, and there is no doubt, according to the *Cincinnati Price Current* and other authorities, that damage by frost resulted during the week under review. How serious this damage may be remains to be seen, but the crop is pecularly susceptible this season, being so late.

STATISTICS.

The probable crops in South Eastern Europe compare with actual returns last year as follows, with a similar comparison for the United States:—

	1907.—Qrs.	1906.—Qrs.
Roumania	7.500,000	15 750,000
Bulgaria	2,000 000	2 000,000
Servia	2 750,000	3 250,000
Hungary	20,000,000	19,000,000
Russia	5.970,000	8,250,000
Total	38,220,000	48,250,000
America	290,000,000	340,000,000
Grand Total	328,220,000	388,250,000

THE AMERICAN MAIZE CROP.

In America, according to the Washington Bureau's report for September 1, the average condition was 80·2, against 90·2 last year, and there is little doubt, judging from the subsequent cabled reports, that the condition has further declined since September 1. The season, has, indeed, been a distinctly unfavourable one, both for maize and oats, the latter showing an average condition of 65·5, against 81·9 last year, and 90·3 in 1905. The following is a comparison of the Bureau's returns since 1899:—

	Condition.					
	July	Aug.	Sept.	Oct	Acreage.	Yield—Bush.
1907 ...	80·2	82·8	80·2		*98,099.000	*2 500,000 000
1906 ...	87·5	88·1	90·2	90.1	96,738,000	2 927 416,000
1905 ...	87·3	89·0	89·5	89·2	94 011,000	2,707 994,900
1904 ...	86·4	87·3	84·6	83·9	92 231 000	2 467,481,000
1903 ...	79·4	78·7	80·1	80·8	88,092,000	2,244,000,000
1902 ...	87·5	86·5	84·3	79·6	94 043,000	2.523 000,000
1901 ...	81·3	54·0	51·7	52·1	91 350 000	1.522.519,000
1900 ...	89·5	87·5	80 6	78·2	*90 000.000	*2,250,000,000
1899 ...	86·5	89·9	85·2	82·7	94 916,000	2 666,000,000

* Estimated.

THE WORLD'S MAIZE CROP.

The following statement gives the actual world's production of maize for the years 1902-1906, with *Beerbohm's* estimate for 1907:—

	Quarters.
1907 (Estimated)	385,000,000
1906 (Actual)	440,000,000
1905 ,, ...	400,000,000
1904 ,, ...	356,000,000
1903 ,, ...	357,000,000
1902 ,, ...	377,000,000

The world's maize consumption is, of course, a varying quantity, which adapts itself to price and the quantity available. During the past season the consumption has been enormous; it remains to be seen whether the relatively high prices, which appear likely to prevail during the coming season will seriously affect the rate of consumption.

The general statistical position of maize on the 27th September was as follows:—

	1907—qrs.	1906—qrs.	1905—qrs.
On passage to U.K.	965,000	930,000	1,120,000
" " Cont.	520,000	870,000	925,000
Imports into U.K. for the 38 weeks ending Sept 21	8,914,700	8,160,300	8,118,800
Visible supply in U.S. *(Bradstreet's)* ...	994,300	878,400	1,086,900
	1906-7	1905-6	1904-5
American crop	340,000,000	316,000,000	285,000,000
	1907.	1906.	1905
New York, Spot	Nom.	56¾c	59¼c
Mark Lane, La Plata landed	26/6	20/6	23 6

SHIPMENTS OF MAIZE TO EUROPE FROM JAN. 1 TO DATE.

	1907. U.K *	1907. Cont.	1906. U.K.*	1906. Cont.	1905. U.K.*	1905. Cont.
	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.
America	3,244,000	3,870,000	3,401,000	5,448,000	4,009,000	5,113,000
Argentine	2,644,000	1,502,000	4,420,000	3,635,000	5,048,000	2,797,000
Russia	1,299,000	1,889,000	170,000	249,000	212,000	476,000
Danube, etc. ...	2,013,000	3,524,000	424,000	1,123,000	126,000	139,000
Total ...	9,200,000	10,785,000	8,415,000	10,455,000	9,395,000	8,525,000

* Includes shipments for orders.

NATAL MEALIE EXPORT.

Discussing the Natal maize export trade, in a recent issue, *South Africa* said:—

"The consignments of Natal mealies which have recently come to hand have met an active market, as much as 26s., and in some cases 26s. 6d. per quarter having been realised. A large quantity has reached Hamburg, Antwerp, and Rotterdam during the last few days to be used for distilling purposes, and good business is stated to have been done."

Coal and Labour Return.

Return of Coal raised and Labour employed at the Natal Collieries for the month of September, 1907 :—

Name of Colliery.	Average Labour Employed.									Output.	
	Above Ground.			Below Ground.			Unproductive Work.*				
	E.	N.	I.	E.	N.	I.	E.	N.	I.	Tons.	Cwt
Natal Navigation ..	34	84	258	22	317	232	—	—	—	24,583	17
Elandslaagte	18	25	272	18	180	450	1	2	3	15,542	0
Durban Navigation ..	26	182	60	10	356	63	—	—	—	14,424	0
Glencoe, Natal ..	13	70	14	11	451	81	—	—	—	13,974	6
South African	10	13	92	11	430	49	5	24	47	13,034	5
Dundee Coal Co. ..	13	11	223	11	34	350	6	8	15	12,886	6
Natal Cambrian ..	13	44	167	9	309	90	3	4	2	11,563	16
St. George's	17	89	124	12	185	146	4	13	—	11,080	0
Newcastle	9	40	26	7	262	6	3	6	—	6,034	6
Ramsay	2	14	42	4	140	80	2	5	8	3,608	0
Natal Steam Coal Co. ..	1	47	4	2	146	2	1	4	1	3,048	19
Central	4	68	10	6	234	11	1	4	—	2,962	0
West Lennoxton ..	5	2	62	2	26	106	1	1	—	2,789	0
Talana (Natal) ..	3	16	21	3	30	98	1	2	1	1,864	12
Vryheid†	2	9	—	2	5	—	—	—	—	42	0
Vaalbank .. .	—	—	—	1	4	—	1	4	—	4	0
Dumbi Mountains ..	1	1	—	—	—	—	—	—	—	2	0
Totals	171	715	1,375	131	3,109	1,764	29	77	77	137,443	7
Corresponding month, '06	156	730	1,260	122	2,497	1,565	56	233	249	99,014	17

* Cost charged to Capital Account. † Includes August Return.

Maritzburg,
8th October, 1907.

CHAS. J. GRAY,
Commissioner of Mines.

Return of Coal bunkered and exported from the Port of Durban for the month of September, 1907 :—

	Tons.	Cwt
Bunker Coal*	56,518	19
Exported to :—		
East London	1,507	1
Algoa Bay	268	16
Mossel Bay	830	17
Cape Town	12,955	10
Mauritius	7,281	1
Bombay	2,251	13
Beira...	59	7
London	4	0
Total	81,677	4

* Including H.M. Warships.

W. L. HOWE,
for Collector of Customs.

Custom House, Port Natal,
1[illegible] October, 1907.

Manures on the Natal Market, Season 1907.

NAME OF MANURE.	NITROGEN.		PHOSPHORIC ACID.								POTASH.		Estimated Total Value of Manure per Ton (2,000 lbs.)	Price asked per Ton of 2,000 lbs. f.o.r. Durban.
			Water Soluble.		Citrate Soluble.		Citrate Insoluble.		TOTAL.					
	Per Cent.	Value in One Ton of Manure.	Per Cent.	Value in One Ton of Manure.	Per Cent.	Value in One Ton of Manure.	Per Cent.	Value in One Ton of Manure.	Per Cent.	Value in One Ton of Manure.	Per Cent.	Value in One Ton of Manure.		
Nitrogenous:		£ s. d.		£ s. d.		£ s. d.		£ s. d.		£ s. d.		£ s. d.	£ s. d.	£ s. d.
Nitrate of Soda	16·02	12 13 8	...	...	...	...	...	...	...	...	...	...	12 13 8	12 10 0*a*
do. do.	15·51	12 5 7	...	...	...	...	...	...	...	...	...	...	12 5 7	12 4 6*b*
Mainly Phosphatic:														
Superphosphate (Double)	...	...	39·76	11 2 0	2·82	0 11 9	0·34	0 0 11	42·92	11 14 8	...	...	11 14 8	12 0 6*c*
Superphosphate (High Grade)	...	...	17·50	4 17 9	1·52	0 6 4	0·22	0 0 7	19·24	5 4 8	...	...	5 4 8	5 4 6*d*
Superphosphate (Ordinary)	...	...	13·74	3 16 9	2·05	0 8 7	0·96	0 2 8	16·75	4 8 0	...	...	4 8 0	... *e*
Bone Flour (Steamed)	1·37	0 15 9	...	..	9·05	1 17 9	23·83	3 5 6	32·88	5 3 3	...	...	5 19 0	6 0 0*a*
Bone Ground ...	4·05	2 6 7	...	...	4·15	0 17 4	20·41	2 16 1	24·56	3 13 5	...	...	6 0 0	6 0 0*a*
do. do. ...	3·99	2 5 11	...	...	5·64	1 3 6	17·97	2 9 5	23·61	3 12 11	...	...	5 18 10	6 4 2*f*
Basic Slag ...	...	...	...	...	8·65	2 3 3	9·31	1 14 11	17·96	3 18 2	...	...	3 18 2	3 19 6*b*
Potassic:														
Sulphate of Potash	...	...	...	...	...	...	...	...	...	..	50·61	13 8 4	13 8 4	13 10 0*a*
Kainit ...	...	...	...	...	...	...	...	..	...	...	12·65	2 19 0	2 19 0	2 17 6*b*
Complete:														
Potato	2·68	2 1 2	7·52	2 2 0	3·35	0 14 0	2·48	0 6 10	13·35	3 2 10	3·71	0 17 4	6 1 4	7 12 0*d*

NAMES OF SELLERS.—*a*—South African Fertilizers Co. *b*—Steel, Murray & Co. *c*—F. & G. Reiche. *d*—J. Raw & Co. *e*—Natal Chemical Syndicate, Ltd. *f*—H. C. Foss & Co., Ladysmith.

Meteorological Returns.

Meteorological Observations taken at Government Stations for Month of Sept., 1907.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.).				RAINFALL (IN INCHES).					
	Means for Month.		Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heav'st rainfall in 1 day.		Total for Year from July 1st, 1907.	Total for same per'd from July 1st, 1906
	Maximum	Minimum					Fall.	Day.		
Observatory ..	75·8	59·6	84·2	54	2·89	13	1·35	11th	3·06	4·39
Stanger ..	78·7	57·3	91	47	2·97	12	1·52	10th	4·[illegible]4	4·36
Verulam ..	83·6	62·5	92	52	3·34	9	1·61	10th	3·59	4·85
Greytown ..	76·8	47·3	93	37	2·[illegible]8	10	1·01	19th	2·47	2·90
Newcastle .	78·4	49·5	91	40	2·83	6	·82	18th	2·83	3·64
Ndwedwe ..	72·9	58·0	82	50	3·06	8	1·21	11th	3·51	5·72
Estcourt ..	78·8	45·6	90	36	1·30	5	·55	19th	1·30	2·51
Mid-Illovo ..	75·1	53·5	93	46	2·91	9	1·34	11th	3·41	5·55
Bulwer ..	—	—	—	—	3·53	14	1·19	10th	3·75	—
Camperdown ..	80·5	54·2	93	45	1·38	5	·92	10th	2·00	3·92
Port Shepstone ..	74·9	54·5	84	45	1·82	6	·49	11th	2·71	5·87
Richmond ..	76·1	50·5	93	39	3·[illegible]0	11	1·24	10th	3·50	4·37
Maritzburg ..	76·9	52·9	95	45	2·63	8	1·21	10th	2·63	5·55
Howick ..	74·7	47·9	100	38	2·72	6	1·34	10th	3·06	3·79
Dundee ..	76·6	53·2	88	44	2·98	6	1·0[illegible]	29th	2·98	2·35
Weenen Gaol ..	85·4	48·5	99	40	1·74	6	·80	18th	1·74	1.80
New Hanover ..	77·8	50·2	93	42	3·23	13	1·37	10th	3·52	4·38
Utrecht ..	83·3	37·7	101	28	1·40	5	·47	29th	1·40	—
Vryheid ..	—	48·3	—	29	3·38	6	·90	22nd	3·[illegible]8	2·48
Nongoma ..	74·9	46·6	104	40	2·32	8	·70	18th	2·52	5·53
Nqutu ..	74·2	50·8	88	42	1·38	8	·59	18th	1·88	1·65
Mtunzini .	81·7	54·8	92	40	4·87	9	2·30	11th	6·79	—
Hlabisa ..	77·9	58·6	97	53	3·98	6	1·38	19th	4·25	5·05
Melmoth ..	79·2	54·3	103	46	2·40	12	·72	19th	2·46	3·52
Ubombo ..	78·4	58·7	85	51	1·37	10	·62	21st	2·02	3·39
Point ..	—	—	—	—	5·51	12	1·43	1[illegible]th	5·83	5·40
Charlestown ..	71·4	43·4	85	33	1·56	9	·65	19th	1·56	1·49
Ingwavumà ..	—	—	—	—	1·66	4	·83	19th	1·66	3·56
Mahlabatini ..	79·3	47·4	100	40	1·90	8	·80	18th	1·90	3·35
Empangeni .	77·3	58·9	96	50	3·23	10	·92	10th	3·95	4·77
Amatikulu ..	80·1	59·3	94	53	1·35	12	·55	10th	2·14	3·91

Meteorological Observations taken at Private Stations for Month of Sept., 1907.

STATIONS.	TEMPERATURE (in Fahr. Degrees.)		RAINFALL (in inches).					
	Maximum for Month	Minimum for Month.	Total for Month.	No. of days.	Heaviest Rainfall in one day.		Total for Year from July 1st, 1907.	Total for same period from July, 1906.
					Fall.	Day.		
Dalton	—	—	2·53	10	0·99	10th	2·69	—
Branxholme	—	—	3·90	9	1·35	18th	4·61	5·11
Giant's Castle	74·8	44	1·57	7	0·83	11th	2·20	—
Nottingham Road	—	—	3·06	8	1·41	10th	3·39	4·49
Adamshurst (Wm. Adams)	93	45	2·04	5	1	10th	2·11	—
Hilton	90	42	2·75	11	1·29	10th	2·98	4·93
P.M.B. Town Bush Valley	—	—	3·03	9	1·13	10th	3·59	5·16
Cedara—Hill	90	40	2·02	7	1·10	10th	2·15	3·96
,, Vlei	95	36	2·17	8	1·10	10th	2·32	3·86
Winkel Spruit	82	51	3·73	9	2·12	10th	5·35	5·05
Ottawa	—	—	2·80	7	1·40	11th	2·8[illegible]	—
Mount Edgecombe (Natal Estates) ..	—	—	3·22	10	1·71	1[illegible]th	3·84	5·46
Cornubia ,, ..	—	—	3·20	—	—	—	3·82	—
Milkwood Kraal ,, ..	—	—	2·40	—	—	—	2·91	4·99
Blackburn ,, ..	—	—	2·91	—	—	—	3·76	4·12
Saccharine ,, ..	—	—	2·91	—	—	—	3·40	4·78
Equeefa (W. Hawksworth)	89	54	2·33	8	0·84	11th	2·91	6·25
Umzinto, Beneva	—	—	2·43	8	0·77	10th	2·76	6·19
Riet Vlei	—	—	1·98	7	0·91	1[illegible]th	2·05	—

Return of Farms at Present under Licence for Lungsickness and Scab.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
A. P. Craw	Ladysmith ..	Scab	P. Nicholson ..	Nicholson's Nek
		,,	G. J. McDouling ..	Waterford
		,,	W. Anderson ..	Netherby
		,,	Jimze	Rossboom
		,,	Mapelwana ..	Roodepoort
		,,	W. M. Buys ..	Ruit Kuil
		,,	F. Colling ..	Klipdal
		,,	F. T. Hyde ..	Himsley
		,,	H. O. Hyde ..	Allen Park
		,,	H. N. Nel ..	Catharine
		,,	Ingetenga ..	Roodepoort
		,,	Mabinda ..	Tijflaar
		,,	J. van de Bosch ..	Ruther Glen
J. R. Cooper ..	Nkandhla & Nqutu	,,	Mkungeni ..	Jojoseni
		,,	A. Mbala ..	Blood River
		,,	Vinuve Libuna ..	Nkandi
		,,	Luhlenia Ka etc. ..	Magala
		,,	Sotshata Ka ..	Nondweni
		,,	Strinera Ka Yabya	Tilizi Hill
		,,	Liyo Ka Norhayi ..	Mapaswaneni
		,,	Komana Ka Makaskela	Siluyela
		,,	Hlanganiza Ka Sili	Nigasini
		,,	Ngcongcoya Ka Pepa	,,
		,,	Kinisenika Makwangqa	Selutshana
		,,	Legudhla Mnti .	Nqutu Hill
		,,	Gada eni Chief ..	Sandheawana
		,,	Makuba Ulife ..	Haladu
		,,	Menezi Kamadagata	Kwondekca
		,,	Boy Ka Matato ..	Nqutu Loot
		,,	Peli ..	Nqutu
		,,	Lerazake Leputza ..	Mafethling
		,,	Abela Kuzeizili ..	,,
		,,	Nsinango Butelezi	Selutstana
		,,	Sekwata Ngobeze ..	Nqutu
		,,	Lepondo and others	Hlazagaza
		,,	Madwo and others	,,
		,,	Guzi Ka Mfeka ..	,,
		,,	Lekemga ..	,,
		,,	Mpitipiti ..	Sandheawana
		,,	Dak sele ..	Selutyema
		,,	Somtomo Ngobeze	Malagato
		,,	Dabeni Mqube ..	Moweni
		,,	Jabez Mbata ..	Nqutu Town
		,,	Albert Selepe ..	Magubeni
		,,	Leyarha Sondetzi ..	Nkandi
		,,	Letuya Mlefe ..	Ncenceni
		,,	Letuza Mlefe ..	Haladu
		,,	Lunwy za Sondelzi	Nkandi
		,,	Kanyiza Ntombelha	Magogo
		,,	Mishaki Butelzt ..	Nqutu
		,,	Mbanko Dubenzana	Telezi Hill
		,,	Mhlawafa Mhlobo	Mkanjaio
		,,	Lefablaselepe ..	Nqutu
S. A. Brown ..	Underberg ..	,,	J. A. Stone ..	
		,,	T. de C. Arbuckle ..	Kerridge
		,,	B. Phipson ..	Strathcampbell
		,,	M. Fraser ..	Winterhoek
		,,	R. C. Gold ..	Woodend
		,,	J. R. Royston ..	Greenend
		,,	J. van Whye ..	Silburn
		,,	F. A. Hathorn ..	Sauguana
		,,	T. Palframan ..	Slogoma
A. B. Koe ..	Portion of Estcourt	,,	J. J. B. Cooke ..	Estcourt
		,	F. R. Moor ..	Greystones
A. J. Marshall ..	Dundee	,,	R. J. du Bois ..	Giba
		,,	J. W. de Bruyns ..	Rooifontein

RETURN OF FARMS AT PRESENT UNDER LICENCE FOR LUNGSICKNESS AND SCAB—*continued.*

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
A. J. Marshall	Dundee	Scab	C.M. &T.C Vermaak	Paddock & Harriotdale
		,,	J. P. Nel	Earnscliffe
		,,	A. C. Vermaak	Sigtuna
		,,	C. J. Pieters	Zwaartwater
		,,	P. J. Meyer	Kilburn
		,,	A. Date	Kemperweldt
		,,	C. P. Cronje	Kilburn
E. Varty	Western Umvoti	,,	C. A. Charlwood	Craigieburn
J. J. Hodson	Ptn of Lion's River	,,	R. Spiers	Moyeni
		,,	W. Willson	Thornton House
		,,	W. A. Dales	Gowrie
		,,	G. Woodhouse	Halliwe
		,,	G. H. Burgmann	Boschhoek
R. Mayne	Krantzkop	Lungsickness	Maqamganse	Loots Hoek
		,,	Uqupu	Myoniezwe's Locat'n
		,,	Ndabane	,,
		,,	S. Johnson & Co.	Inadie Store
		,,	Ndabane	Myoniezwe's Locat'n
		,,	Natives	Myoniezwe's Locat'n
		,,	Amosi	
A. H. Ball	Weenen	Scab	Vunyo and others	Elena Berg
		,,	Kwinkwe	Belle Vue
		,,	Tshoboso	,,
		,,	C. Strapp	Lilyfontein
		,,	T, J. Van Rooyen	Belle Vue
		,,	L. J. & T. C. Lotter	Waterfall
		,,	S. C. Van Rooyen	Middleburg
		,,	A. & M. Lotter	Waterfall
		,,	C. P. F. Lotter	,,
		,,	D. Huyser	Bird Spruit
		,,	J. L. Fourie	Scottshoek
G. Daniell	Vryheid	,,	Nkanyeze	Mooiplaats
		,,	D. Coetzee	Doornhoek
		,,	Mtolie	Beaufort
		,,	Zimbata	Nooitgedacht
R. Mayne	Eastern Umvoti	Lungsickness	Nkabi and others	Loots Hoek
		Scab	P. Mare	Speculation
J. Button	Portion of Estcourt	,,	J. J. Marais	Malan Spruit
		,,	C. Groom	Springvale
E. Parkinson	New Hanover	,,	Ndabeni and Jim	Location
		,,	W. J. Dickens	Laager Farm
A. Hair	City and Umgeni	,,	Umsutu	Zwaartkop Location
		,,	Lutye	,,
		,,	Ndudane	Bishopstowe
D. M. Pfaff	Utrecht	,,	P. Pretorius	Geluk
		,,	B. J. J. Human	Weltevreden
J. Stewart	Bergville	,,	H. Jackson	Lytton
		,,	J. Bester	Abergeldie
		,,	J. Lawford	Mt. Hilda
R. Wingfield Stratford	Newcastle	,,	G. W. Thomas	Kingston
		,,	D. Keay	Churnwood
		,,	J. Havemann	Flaklaagte
		,,	J. H. Muller	Leyden
		,,	C. Friend	Lilydale
		,,	J. van Niekerk	Pomeroy
		,,	J. de Wet.	Schuinhoogte
J. G. Speirs	Impendhle	,,	Pinda, Vete & Sobuon	Furth
A. Brown	Polela	,,	Mahlali	Stoffletown
		,,	F. J. Livingstone	Fernbank
		,,	H. Cole	Cameron
		,,	P. J. Venter	Everfair & Springholmes
L. Trenor	Harding	Lungsickness	Madunckana	Tridale
		,,	Yanyan	Mlotshwa
		Scab	F. C. Young	Winterhoek
C. T. Vaughan	Paulpietersburg	,,	G. C. Viljoen	Makaske Kop
		,,	J. Potgieter	,,
		,,	G. J. Viljoen	Rondekoppie
		,,	G. J. Combrink	Paapkuilvlei
		,,	H. J. Potgieter	Zuchkraal
B. Klusener	Port Shepstone	Lungsickness	G Daddy	Sugar Bush Cutting
		,,	Mbontshe	Isotsha

MANGE IN HORSES EXISTS AS UNDER.

Name.	District.	Name.	District.
Nseleni	Markwa Mountain.	J. Raw & Co.	Umgeni.
Abbott Bros.	Highlands.	Genegwa	Polela, Location No. 2

Pound Notices.

NOTIFICATION is contained in the *Government Gazette* of the sale, unless previously released, of the undermentioned live stock on the dates specified :—

ON THE 6TH NOVEMBER :

Finchley (Ixopo Division).—Black sow, four white feet.

Karlsruhe (Lower Umzimkulu Division).—Chestnut pony, white face, in low condition.

Middledale (Klip River Division).—(1) Black Kafir goat, ewe, marked swallow tail and half moon on right ear. (2) Black Kafir goat, ewe, no marks.

Mooi River.—Dark chestnut stallion, both hind legs white, white strip down face, 3 years old, no brands. Probable value, £6. Impounded on the 23rd September by Mr. E. Ratsay.

Vryheid.—Blue grey she goat, right ear slit, left ear top cut off ; with black kid, no marks, found among Native Inpalaza's goats. Owner unknown. Impounded by Natal Police.

ON THE 20TH NOVEMBER :

Acton Homes.—(1) Black mare, 13.3, about four years old, nick out of right ear. (2) Bay two-year-old filly, two white hind feet. (3) Mouse-coloured colt foal.

Creighton.—(1) Black ewe, slit in off-side ear. (2) Black ewe, brown belly, two brown stripes down face, small V-shape slit off-side ear.

Finchley (Ixopo Division).—White pig, hog, black head and neck, stump tail.

Howick—(1) Running on the farm "Allerthorpe," Dargle Road, and reported by Mr. E. Turner as too wild to be driven to the Pound : bay filly, three years, black points, long mane and tail, indistinct brand on left hip. (2) Running on the farm "Howick Grange," and reported by Mr. Thos. Westray as too wild to be driven to the Howick Pound : wether, half of left ear off and X on left side.

Richmond.—Reported by Mr. J. H. Clark as running on the farm "Delectable Dale," and too wild to be driven to the Pound : black ox, white on belly, inclined to be grey on flanks, upstanding horns, about 7 years old, no brands.

South Coast Junction.—Brown American mare mule, aged, white patch near front leg, branded on near neck V, near rump square in circle and 485 underneath, the 4 of which is reversed.

Umsinga—(1) Three black and three brown goats, no brands or marks. Probable value, 30s. (2) Three black Kafir sheep (ewes) and one lamb.

CHANGES.

After the 31st October the Pound at Impendhle will be abolished, Mr. J. W. Brooke having resigned his appointment as keeper thereof. A Pound has been established at Hilton Road, with Mr. John Norman Pechey as keeper.

East Coast Fever.

SLAUGHTER CATTLE.

The Department of Agriculture has erected abattoirs adjoining the Government Cold Stores, Maritzburg, where people will be able to forward cattle from clean and infected areas for slaughter. Killing, chilling, and freezing can be undertaken by the Department if desired, and arrangements can also be made for the forwarding by rail of meat intended for sale in markets outside Maritzburg. This will enable farmers, who wish to dispose of their stock for slaughter and find a difficulty in so doing, to have their animals killed in Maritzburg and the meat forwarded to Durban or any other market. The abattoirs will be under the personal supervision of Mr. A. R Burford, the Manager of the Government Cold Stores, who is thoroughly experienced in this particular class of work.

The provisional abattoir charges are :—

Cattle per head	1s., with a minimum of £3 per killing space per month.
Sheep	1½d. each.
Pigs...	3d. ,,

Chilling and Freezing Beef,	1st week	1s. 3d. per qr.
,, ,,	2nd ,, ...	1s. ,,
,, ,,	Remaining weeks ...	9d. ,,
Sheep	per week	3d.
Pigs	,, ...	6d.

Charges for killing and handling Cattle. and placing same in Cold Storage, if required, or meat to be taken away by customer from hanging-room :—

Cattle, per head	4s. each (including abattoir fee).
Sheep	6d. ,,
Pigs	1s. ,, up to 200 lbs.
,, ...	1s. 6d. each, over 200 lbs. & up to 300 lbs.
,, ...	2s. ,, over 300 lbs.

W. A. DEANE,
Minister of Agriculture.

Department of Agriculture, Maritzburg,
9th April 1907.

Cows Wanted.

Wanted urgently, cows just calved or due to calve. Old animals suitable ; any breed.

Apply—P.O. Box 282,
Pietermaritzburg.

Seeds for Distribution.

Seeds of the following have been secured for distribution to farmers at cost price :—Cotton, Sugar Beet, Tobacco, Rice, Lupins and Field Peas, Italian and Perennial Rye Grass, Paspalum and Cocksfoot. Varieties and prices upon application to the Farm Manager, C.X F., Cedara.

E. R. SAWER,
Director, Experiment Stations.

Brands Allotted to Infected Magisterial Divisions.

The following is a list of the brands which have been allotted to the several infected Magisterial Divisions: Durban County, D. 2; Alexandra County, A. 2; Lower Tugela, T. 2; Mapumulo, S. 2; Inanda, B. 2; Umsinga, U. 2; Dundee, X. 2; Vryheid, V. 2; Ngotshe, H. 2; Paulpietersburg, P. 2; Nongoma G. 2; Mahlabatini, L. 2; Ndwedwe, N. 2; Weenen County, W. 2; Umvoti, F. 2; Hlabisa, K. 2; Eshowe, E. 2; Ladysmith R. 2; Babanango, O. 2.

Employment Bureau.

THE Department of Agriculture has received applications from the undermentioned, who are prepared to become assistants or apprentices on farms. The Department will be glad to hear from farmers willing to take young men as assistants, and to place them in correspondence with the various applicants. When communicating on the subject, farmers may refer to the applicants by quoting the numbers in the following list:—

No. 91a.—Scotchman, 42, seeks management of stud. Life experience as tenant farmer in south of Scotland, breeding, rearing, breaking and showing Clydesdales, hackneys, and half-breds. Has bought horses in Ireland and taken charge of them on board ship and while on rails. References and testimonials.

No. 95.—German, of respectable appearance, who speaks English fluently, desires employment on a farm. Is 48 years of age, and has been accustomed to farm work, wire fencing, masonry, carpentry, &c. Salary required.

No. 97a.—Colonial, aged 22, bricklayer by trade, speaks Zulu, Dutch, and Hindustan, desires employment as a farm hand. Was on a farm in vicinity of Pretoria for six months.

No 100.—Englishman, 23, with experience gained in Richmond district, desires to get on to farm further up country. States he is active and not afraid of work Wage no particular object.

No. 102.—Applicant, 45 years of age, at present a factory manager in Mauritius, desires employment in Natal. Has had 25 years' experience in the cultivation of sugar cane and vanilla. Produces good testimonials. Services are likely to be available shortly owing to failure of the cane crop. Is married, with family.

104a.—Yorkshireman, 36 years of age, seeks position as manager of a farm. English and Colonial experience. Was at one time manager of an experiment station. Good references. Married.

105a.—Boy, 17, English, desires employment on a farm.

106a.—Colonial, aged 24, bricklayer by trade, desires situation on a farm. Steady and reliable, with a few months' experience of farming.

107a.—About 45 years of age, who has held positions of responsibility on the N.G.R. and Rhodesian Railways, desires employment. Produces good references.

Executives of Farmers' Associations.

ALFRED COUNTY FARMERS' ASSOCIATION.—President: A. G. Prentice, J.P. Vice-Presidents: C. Knox, J.P., L. T. Trenor. Committee: C. M. Etheridge, E. J. Gray, W. B. Rethman, H. W. F. Rethman, C. A. Howell, R. E H. Fann, J.P., W. T. J. Gold, Dr. Case, Revd. S. Aitchison. Hon. Treasurer: H. C. Hitchins. Secretary: T. Tribe.

BOSTON FARMERS' ASSOCIATION.—President: Thomas Fleming. Vice-President: J. Geldert. Hon. Secretary and Treasurer. W. J. Fly.

CAMPERDOWN AGRICULTURAL SOCIETY.—President: John Moon, C.O.; Vice-Presidents: A. N. Kirkman, J.P., and G. Swales; Hon. Secretary: — Wilson.

CAMPERDOWN AND DISTRICT FARMERS' ASSOCIATION.—President: John Moon, J.P. Vice-President: F. N. Meyer. Hon. Sec.: J. Baker. Committee: H. Baker, J. Gavin, J. W. Harvey, J.P., W. B. Turner, H. H. Hutton, C. Baker, H. E. Meyer.

DUNDEE AGRICULTURAL SOCIETY.—President: F. Turton, Esq., J.P. Vice-Presidents: The Minister of Agriculture, the Mayor of Dundee, Messrs. A. L. Jansen, H. Ryley, and W. Craighead Smith, J.P. Hon. Secretary and Treasurer: J. McKenzie. Committee: D. C. Pieters, D. Macphail, W. H. Tatham, H. Baasch, M. Taylor, J. A. Landman, N. F. Hesom, A. W. Smallie, C. W. Whysall, W. Craig, C. G. Willson, T. P. Smith, J. Campbell, J. B. Duboisee. W. R. Quested, A. Grice, D. Meumann, W. J. H. Muller, J. E. Caldwell, E. C. Saville, C. M. Meyer, A. J, Oldacre.

DURBAN COUNTY FARMERS' ASSOCIATION.—Patron: J. H. Colenbrander. President: J. McIntosh. Vice-Presidents: H. Westermeyer, R. R. McDonald. Committee: F. R. W. Bœhmer, G. Compton, H. Freese, W. Freese, W. Gillitt, H. W. Kœnigkræmer, H. W. Nichols, F. Schæfermann. Hon. Sec. and Treasurer: Frank J. Volek.

ESHOWE DISTRICT FARMERS' ASSOCIATION.—President: J. R. Pennefather. Vice-President: C. F. Adams. Secretary: T. Parkins. Treasurer: W. T. Brockwell.

GOURTON FARMERS' ASSOCIATION.—President: W. C. Stockil, Esq., J.P. Vice-President: M. Sandison, Esq. Hon. Secretary and Treasurer: Frederick B. Burnard, Esq.

HATTING SPRUIT FARMERS' ASSOCIATION.—President: J. Campbell. Vice-President: A. W. Smallie. Hon. Secretary and Treasurer: R. J. Hearn. Committee: G. Queddon, T. P. Smith, W. A. Helmer, Thos. Brookes, N. Glutz. Wm. Craig, W. R. Quested, J. A. Brookes, W. T. Heslop, Thos. Dewar, F. Turton, W. H. Tatham, A. E. Norman, D. P. Campbell.

HIMEVILLE AGRICULTURAL SOCIETY.—President: Henry C. Gold, Dartford, Polela. Vice-Presidents: W. Little, F. E. Peto, G. Malcolm. Hon. Sec. and Treasurer: G. Palframan, Watermead, Polela. Executive Committee: G. Malcolm, W. S. Johnston, P. McKenzie, W. Little, G. Royston. Yard Steward: H. Brown Auditors: T. C. Dearlove and T. E. Marriott.

HOWICK FARMERS' ASSOCIATION.—Chairman, Thos. Morton; Vice-Chairman, M. A. Sutton; Hon. Secretary and Treasurer, A Clark.

INGOGO FARMERS ASSOCIATION.—President: Angus Wood, J.P. Vice-Presidents: G. A. Fimstone and J. Browning. Hon. Secretary and Treasurer: C. Watt.

IXOPO AGRICULTURAL SOCIETY. — President: W. Arnott. Vice-Presidents: F. L. Thring, J.P., John Anderson, C. E. Hancock, J.P. Committee: W. K. Anderson, J.P., Thos Allen, J. C. Auld, H. D. Archibald, F. S. Beningfield, S. Boyd, F. E. Foxon, R.M., Wm. Foster, Jas. T. Foster, Geo. E. Francis, L. Gray, A. M. Greer, J.P., J. R. Greer, Wm. Gold, Jno. Gold, H. A. Hill, C. F. Harris, A. E. Keith, R. Kennedy, Geo. Martin, W. Oakes, L. J. Phipps, T. F. Remfry, J. W. Robinson, Jas. Schofield, M.L.A., A. Stone, W. R. Way, G. C. Way, A. H. Walker, M.L.A., J. L. Webb (F.R.C.V.S.). Hon. Sec: G. C. Ways. Hon. Ass. Sec.: A. G. Harris. Hon. Treasurer: T. Arnott.

IXOPO FARMERS' ASSOCIATION.—President: A. E. L. Keith, Ixopo Vice-Presidents; Geo. Martin, Claybrooke, Ixopo; A. Kirkman, Lufafa, Ixopo

Hon. Secretary and Treasurer: Geo. E. Francis, Morningview, Ixopo. Delegates to Farmers' Union: President and James Foster. Committee: F. Remfry, R. Vause, C. E. Hancock, John Anderson, R. Greer, W. Oakes, D. Campbell, G. C. Way, James Foster.

KLIP RIVER AGRICULTURAL SOCIETY.—President: Herman Illing; Vice-Presidents: J. T. Francis, J. G. Bester, W. Pepworth. Auditor: J. T. Francis, Esq. Secretary: E. Scott, F.I.A. (Lond.). Executive Committee: A. Brink, D. Bester, J. Farquhar, C.M.G., W. C. Hattingh, J. G. Hyde, Trev. Hyde, A. L. Horsley, W. Freer, L. A. Leonard, H. Nicholson, J. H. Newton, J. T. Sandalls, W. H. Roberts, H. C. Thornhill.

KRANTZKOP FARMERS' ASSOCIATION.—President: Capt. M. Landsberg. Vice-President: P. R. Vermaak. Hon. Sec. and Treasurer: Dr. L. L. Proksch. Committee: C. J. van Rooyen (Albany), C. J. van Rooyen (Wonderfontein), Philip Nel, J. A. G. Mare, L. M. G. van Rooyen, J. C. Martens.

LION'S RIVER DIVISION AGRICULTURAL SOCIETY.—President: Graham Hutchinson; Vice-President: H. Nisbet; Executive Committee: H. Nisbet, M. A. Sutton, A. J. Holmes, J. Humphries, Jno. Pole, and W. A. Lawton; Auditor: W. J. R. Harvard; Hon. Sec. and Treasurer: Arthur F. Dicks, P.O. Box 1, Howick.

LITTLE TUGELA FARMERS' ASSOCIATION.—President: F. van de Waal. Vice-President: F. G. King. Secretary and Treasurer: H. L. Frances. Auditor: A. D. Buchanan. Committee: R. P. Summersgill, F. W. Holmes, J. P. Wepenaar, J. J. Harding, Max Cameron.

LOWER TUGELA DIVISION ASSOCIATION.—President: T. G. Colnebrander. Vice-President: Lieut.-Col. F. Addison. Hon. Secretary and Treasurer: H. Curtis Smith. Committee: A. S. L. Hulett, A. E. Foss, G. Stewart, J. B. Hulett.

LOWER UMZIMKULU AGRICULTURAL ASSOCIATION.—President: D. C. Aiken, J.P. Vice-Presidents: H. Albers and C. H. Mitchell, J.P. Hon. Secretary and Treasurer: W. J. Plows. Committee: C. Manning, J. W. Aiken, W. G. Camp, T. F. Godwin, J. Hutton, H. Norden and A. Borchard. Hon. Secretary, Show Committee: J. W. Aiken. Show Committee: A. E. Collison, A. Borchard, F. Knoop, A. Ringo, H. F. Voigts, J. Hutton, C. Manning, A. J. Lugg and H. Albers. Hon. Auditor: J. W. Aiken.

MID-ILLOVO FARMERS' CLUB.—Chairman: L. G. Wingfield-Stratford J.P. Vice-Chairman: B. B. Evans. Hon. Secretary: J. W. V. Montgomery. Assistant Hon Secretary: S. C. Phipson. Hon. Treasurer: Jos. McCullough.

MOOI RIVER FARMERS' ASSOCIATION.—President: R. Garland; Vice-President: C. B. Lloyd; Hon. Treasurer: H. A. Rohde; Collector: Capt. W. H. Stevenson; Auditor: Claude Scott; Hon. Secretary: H. B. Hall.

MUDEN AGRICULTURAL ASSOCIATION.—President: Thos. Thresh. Vice-Presidents: Wm. Lilje, E. A. Grantham. Secretary and Treasurer. C. A. Selling. Committee: Otto Rottcher, Karl Lilje, Karl Rotter, Herman Schafer, Fritz Torlage, T. Braithwaite, Ernest Rottcher, C. H. Tilbrook, Rev. H. Rottcher (Hon. Life Member).

NEWCASTLE.—President: F. A. R. Johnstone, J.P. Vice-President: C. Earl, J.P., Mayor of Newcastle; Angus Wood, J.P., Ingogo; O. Schwikkard, C.M.G., Newcastle. Secretary: Wm. Beardall. Treasurer: Ed. Nicols. Executive Committee: L. H. S. Jones, E. Phillips, H. C. Caldecott, C. Watson, G. Langley, W. A. Lang, W. J. P. Adendorff, J. E. de Wet, O. Davis, S. W. Reynolds, B. Pettigrew, G. W. Thomas, G. H. Bishop, H. R. Muir, M. C. Adendorff, W. Napier, P. Van Breda, Chriss Botha, G. Templer.

NEW HANOVER AGRICULTURAL ASSOCIATION.—President: R. H. Oellermann. Vice-Presidents: J. C. Watt, J.P., and J. A. Westbrook. Life Member: C. A. S. Yonge, M.L.A. Secretary and Treasurer: W. D. Stewart, New Hanover. Auditor: J. H. F. Hohls. Committee: W. N. Angus, E. Bentley, W. W. Bentley, Edward Boast, H. W. Boast, E. E. Comins, G. R. Comins, C. Crookes, jun., G. Demont, H. Dinklemann, J. Duval, W. Fortmann, Dr. C. H. Herbert, J. Hillermann, J. H. F. Hohls, H. Jacobson, H. A. Light, G. C. Mackenzie, A. F. Mackenzie, T. M. Mackenzie, J. Muirhead, J.P., G. Moe, J. Moe, O. Moe, C. Oellermann, F. Oellermann, R. H. Oellermann, J. C. Otto, H. Oellermann, E. Peckham, J.P., J. A. Potterill, S. Peckham, C. M. Scott, Rev. J. Scott, Wm. Schroder, J.P., Owen Solomon, J. H. Smith, Riby Smith, H. Thöle, F. Thöle, H. Vorwerk, H. F. Westbrook, W. H. Westbrook, C. Westbrook, T. Wolhuter.

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C. Hillermann, L. Koch, H. Köhler, F. E. Kuhn, M. Maister, H. Mereis, A. Meyer, H. Meyer-Estorf, H. W. Meyer, K. A. Meyer, H. Misselhorn, W. Misselhorn, K Peters, I. Pfotenhauer, G. Rabe, G Reiche, Joh. Reiche, W. Rencken, H. Rosenbrock, H. Schmidt, K. Schmidt, Rev. Jas. Scott, K. Seele F. J. Smith, J. Thies, W. Witthöft, P. Worthmann, A. Wortmann, F. Wortmann. H. Wortmann, Secretary : Paul Vietzen, P.O., Singletree ; Hon. Treasurer : E. Beurlen.

NOTTINGHAM ROAD FARMERS' ASSOCIATION.—President : W. Henwood, J.P. Vice-President : J. King, J.P. Auditor : A. Mengens. Secretary and Treasurer : C. J. King, Nottingham Road.

PIETERMARITZBURGSCHE BOEREN VEREENIGING. — President : D. P. Boshoff ; Secretary : E. G. Jansen, 313, Loop Street, Maritzburg.

RICHMOND AGRICULTURAL SOCIETY — President : John Marwick. Vice-Presidents : W. P. Payn, A. W. Cooper, J. W. McKenzie and Chas. Nicholson. Honorary Treasurer : R. Nicholson. Hon. Secretary : Tom M'Crystal. Committee : J. W. T. Marwick, Evan Harries, R. A. McKenzie, F. O. Howes, H. M. Moyes, W. Comrie, Thos. Marwick, J. C. Nicholson, J. W. Flett and E. J. B. Hosking.

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SLANG RIVER (UTRECHT) FARMERS' ASSOCIATION.—Chairman : P. J. Kemp ; Executive Committee : J. J. Uys, J. Z. Moolman, T. J. Botha, P. J. Viljoen, P. J. Kemp ; Hon. Sec. and Treasurer, Thys Uys, Utrecht P.O.

UMVOTI AGRICULTURAL SOCIETY.—President : Major T. Menne. Vice-Presidents : Theunis J. Nel, M.L.A., W. J. Slatter, W. L'Estrange. Executive Committee : Tol Nel, A. Newmarch, W. Lilje, O. Rottcher, S C. Van Rooyen, W. Newmarch, E. J. Van Rooyen, O. Norton, I. M. Nel, J. Browning. Managers of Show Yard : J. M. Handley and N. Hunter. Hon. Auditor : W. K. Ente. Secretary and Treasurer : W. H. Gibbs.

UMVOTI FARMERS' ASSOCIATION.—President : P. R. Botha (J.'s son). Vice-President : J. M. Handley. Secretary and Treasurer : G. E. Cadle (Box 6, Greytown). Auditor : J. M. Nel. Committee : W. J. Slatter, J. G. Nel, H. F. Torlage, R. J. Landsberg, A. Newmarch, P. H. van Rooyen, A. F. Handley.

UPPER BIGGARSBERG FARMERS' ASSOCIATION.—President : George Langley ; Vice-President : W. L. Oldacre ; Secretary : J. H. Murray.

UTRECHT AGRICULTURAL SOCIETY.—Chairman : L. Viljoen ; Vice-Chairman : B. H. Breytenbach ; Members : I. Bierman, M. M. Knight, J. H. Klopper, B. C. Hattingh, T. Botha, M. Gregory, P. L. Uys, H. P. Breytenbach ; Secretary : G. J. Shawe.

UTRECHT BOEREN VEREENIGING.—President : D. J. A. van der Spuy ; Secretary : G. J. Shawe, Utrecht.

VICTORIA COUNTY AGRICULTURAL SOCIETY.—President : Lieut.-Colonel F. Addison ; Vice-Presidents : Sir Liege Hulett, Kt., M.L.A., W. J. Thompson, Esq., J.P., J. Polkinghorne, Esq., M.L.A. ; Committee : Messrs. W. H. B. Addison, G. S. Armstrong, M.L.A., C. Bishop, J.P., D. Brown, sen., J.P., W. Campbell, T. G. Colenbrander, A. E. Foss, J.P., A. S. L. Hulett, J.P., J. B. Hulett, C. Jackson, G. Nicholson, J.P., T. Polkinghorne, J. W. Perkins, J.P., E. Saunders, J.P., G. Stewart, and J. H. Stansell ; Hon. Secretary and Treasurer : H. Curtis Smith (Stanger)

WEENEN AGRICULTURAL SOCIETY.—President : Allan Stuart ; Vice-Presidents : R. Garland, R. H. Ralfe, F. I. de Waal ; Hon. Treasurer : F. C. Schiever ; Hon. Secretary : E. Cautherley ; Auditor : S. Wolff ; Executive Committee : Hon. H. D. Winter M.L.A., J W. Moor, M.L.A., D W. Mackay, T. H. Hindle and E. L'Estrange ; Manager of Show Yard : S. Vaughan ; Assistant : A. Clouston.

WEENEN COUNTY HORTICULTURAL SOCIETY.—Committee of Management: The President and Treasurer of the Weenen Agricultural Society and C. J. Offord, G. W. Linfoot, T. J. Nunn, Dr. Brewitt, S. Vaughan; Hon. Secretary: E. Cautherley.

ZULULAND FARMERS' ASSOCIATION.—President: F. W. White; Vice-President: C. E. Symonds. Committee: J. J. van Rooyen, A. W. Symonds, H. T. James, R. J. Ortlepp, J. P. Kokemoer.

ZULULAND COAST FARMERS' ASSOCIATION.—President: G. H Hulett; Vice-President: C. Hill; Hon. Secretary and Treasurer: F. Brammage, Ginginhlovu.

(The Editor will be obliged if the Hon. Secretaries will supply him with lists of the Executives of their Associations.)

Diamond Drilling.

SOME of the departmental diamond drilling plants are at present disengaged and available for hire for boring for either minerals or water. Particulars as to terms of hire may be obtained from the undersigned.

CHAS. J. GRAY,
Commissioner of Mines.

Purchase of Tree Seeds.

With a view to the encouragement of seed production in the Colony, offers are invited from persons having locally-grown seed of exotic trees for sale. Not less than one pound will be purchased; and a specimen bearing seed vessels or flowers should be sent for identification purposes. Offers should be made in the first instance to the Forester, Cedara.

E. R. SAWER,
Director, Experiment Stations.

Trees for Sale.

TO encourage tree-planting, transplants and seeds of forest trees are supplied by Government, so far as in stock, at the undermentioned rates, exclusive of carriage, from the Government Nursery, Central Experimental Farm, Cedara.

Transplants of Eucalyptus, Pines, Acacias, Casuarinas, Cupressus, etc., about 25 trees in each tin, at 8s. 4d. per 100 trees. Trees in separate tins at 1s. each.

Transplants of scarce kinds, larger trees, or surplus stock, when available, will be charged at special rates, which will be furnished on application.

Tree seeds, in variety, at 1s. per packet. Price per pound, which fluctuates, will be furnished on application.

Package and postage of seed, when required, charged 1s. per lb. extra.

Orders for present or spring delivery should be addressed to the ***Forester, Cedara,*** and must be accompanied by a remittance in cash or postal order. Cheques cannot be accepted.

T. R. SIM,
Conservator of Forests.

Central Experiment Farm, Cedara.

In order to minimise interference with the general course of work on the Central Experiment Farm, Cedara, it has been found necessary to set apart one day of the week, namely, Friday, as a visitors' day.

Arrangements will accordingly be made on that day for receiving visitors and showing them round the Farm. A trap will be at Cedara Station to meet the up 9.50 a.m. train; and if intending visitors from up-country will give notice to the guard at Howick Station, on their way down, a trap will be sent to meet the train which passes through Cedara at 11.2 a.m. Visitors travelling by other trains will also be met if they will previously make arrangements by writing.

On other than the visitors' day, visitors may be received by appointment, but special attention cannot be guaranteed in regard to their being shown round.

As the catering involves such a strain upon the resources of the School of Agriculture, it has been decided to limit the number of delegates from any one Association to 25 per cent. of its membership. At least 14 days' clear notice must be given by Associations, so that there may be time to make all necessary arrangements.

In view of the fact that Parliament has refused to grant the necessary funds, the cost of railway tickets can no longer be borne by the Department of Agriculture.

All communications in connection with proposed visits to the Experiment Farm should be addressed to the Director of Experiment Stations, Cedara.

W. A. DEANE,
Minister of Agriculture.

24th September, 1907

Steam Ploughs.

Applications are invited for the services in the various districts of the Colony of the Steam Ploughs recently ordered by the Government.

Applicants should state clearly the position of their farms, and the total acreage required to be ploughed.

The charges will, for the present, be at the rate of, approximately, 10s. an acre in the Midland and Upland Districts of the Colony, and 15s. an acre in the Coast Districts; but the Government reserves to itself the right to vary these charges later on when experience has been gained as to the actual cost of working.

Preference will be given to those districts affected by East Coast Fever, and, again, to those from which the greatest number of applications are received.

Applicants will be advised, as soon as possible after the ploughs come to hand, whether the Government will be able to undertake the required ploughing, and when the ploughs are likely to be available.

E. T. MULLENS,
Secretary, Minister of Agriculture.

Department of Agriculture, Pietermaritzburg,
4th September, 1907.

Offers are invited for Two 6-Furrow Spalding-Robbins, Stump-Jumping Disc-Ploughs for Steam Traction. These have had little use, and the frames are as good as new, while the Ploughs were fitted with new discs last season. Landed cost of these was £56 each at the Point. Approximate weight, 2,000 lbs.

E. R. SAWER,
Director, Experiment Stations, Cedara.

Rules for Agricultural Co-Operative Societies.

THE Department of Agriculture has for disposal, at the rate of one shilling each, copies of Model Rules for the use of Agricultural Co-operative Societies. Applications should be made to the Secretary, Minister of Agriculture, Pietermaritzburg.

Bulletins Issued by the Dept. of Agriculture.

Single copies may be obtained free (excepting those with price attached) no application to the Secretary, Minister of Agriculture.

No.
1.—"Notes on Fruit Culture," by Claude Fuller. [1902]. *(Out of print).*
2.—"Manures on the Natal Market, 1902," by A Pardy. [1902].
3.—"Insects in an Important Rôle," by Claude Fuller. [1904]. *(Out of Print).*
4.—"Manures on the Natal Market, 1903," by A. Pardy. [1903].
5.—"Weed Circular," by Claude Fuller. [1905].
6.—"Manures on the Natal Market, 1904," by A. Pardy. [1904].
7.—"Tree-planting in Natal," by T. R. Sim. [1905]. *(Price 2s. 6d.)*
8.—"Agricultural Co-operation," by E. T. Mullens. [1905]. *(Out of Print)*
9.—"Potato Culture" by A. N. Pearson. [1905].
10.—"Manures on Natal Market, 1905," by A. Pardy. [1905].
"Agricultural Statistics, Natal, 1904-5." [1906].
11.—"East Coast Fever," by S. B. Woollatt. [1906]
12.—"Manures on Natal Market, 1906," by A. Pardy. [1906].

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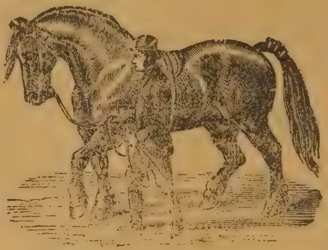

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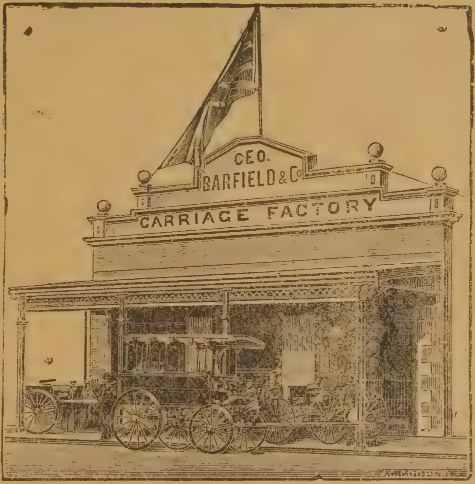

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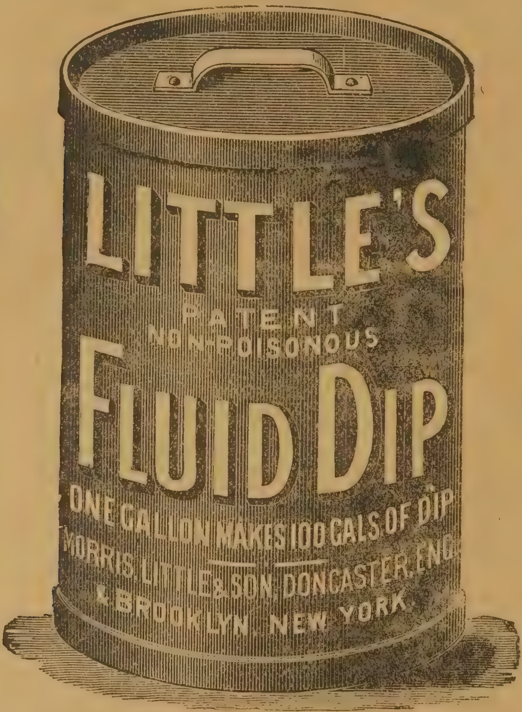
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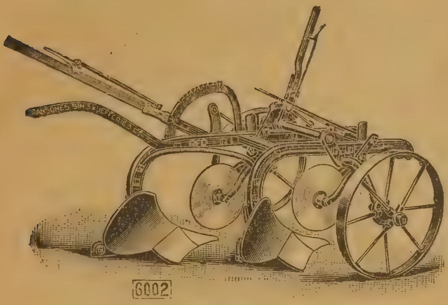

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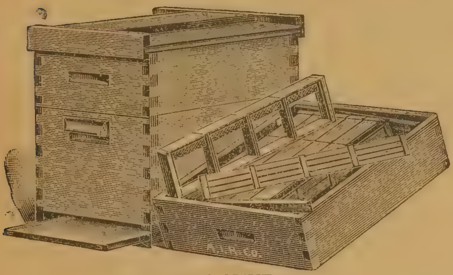

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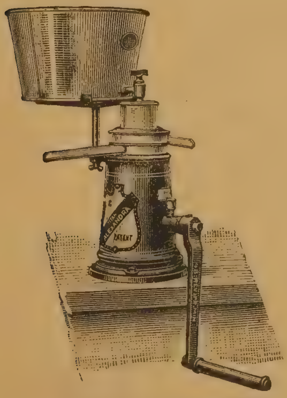

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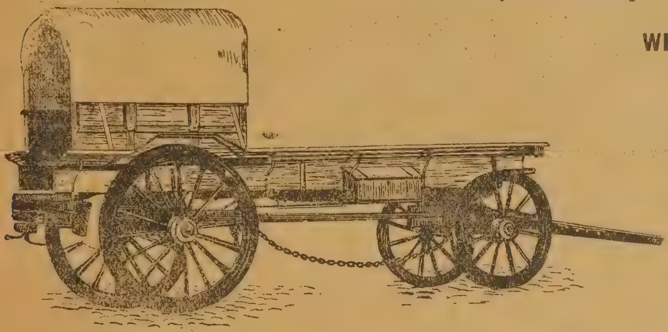

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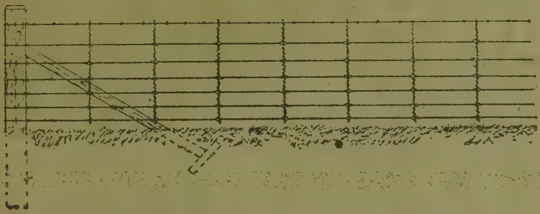

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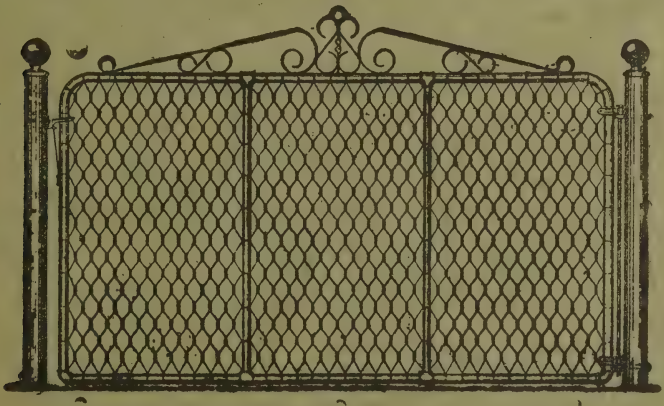

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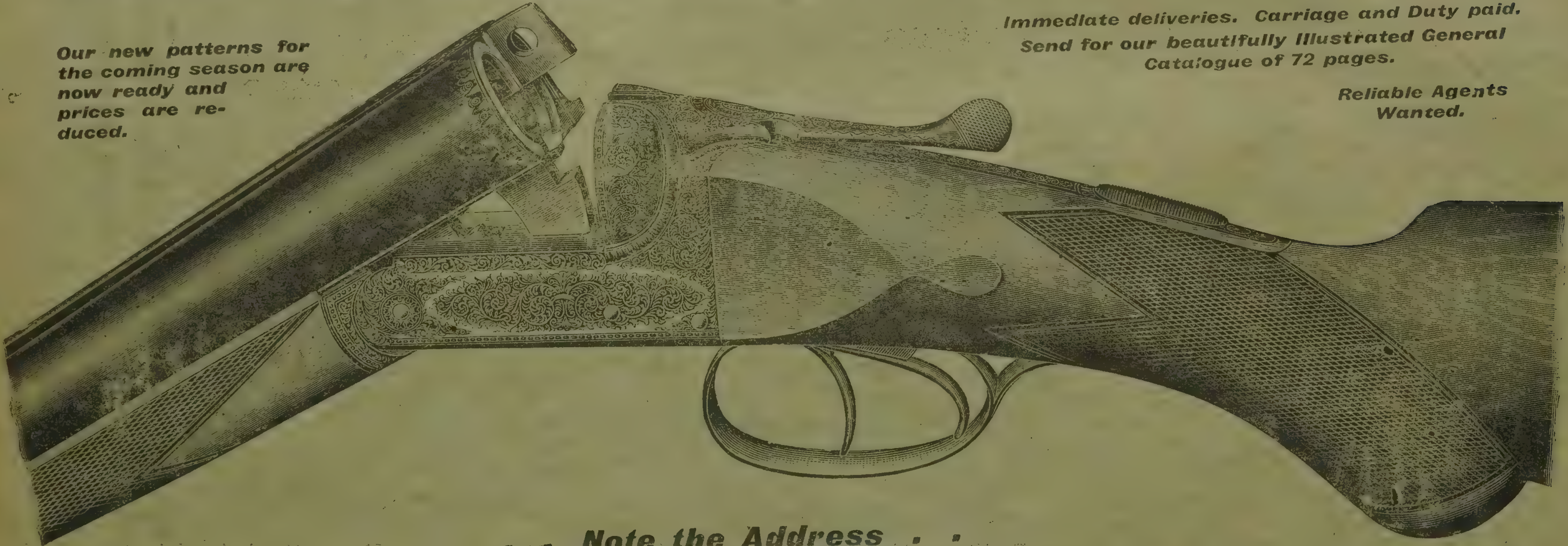

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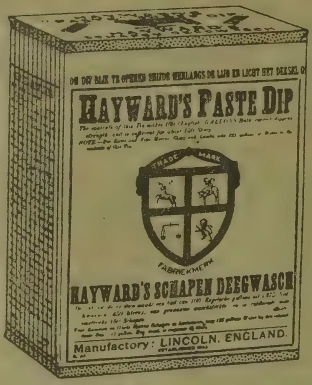
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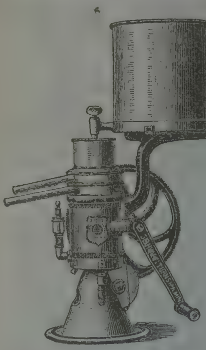

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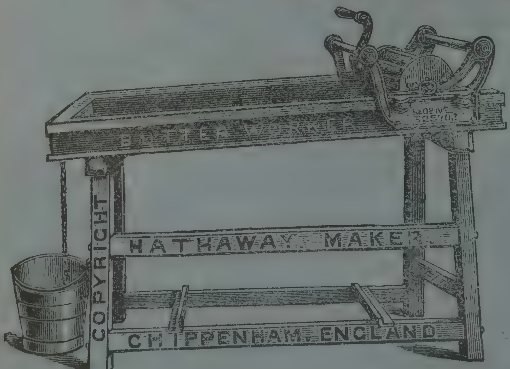

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No. 11. NOVEMBER 29, 1907. Vol. X.

THE NATAL AGRICULTURAL JOURNAL AND MINING RECORD

CLAUDE FULLER, del

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1st Prize	,,	,,	,,	,,	*PORT SHEPSTONE SHOW*
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Vol. X., No. 11. *NOVEMBER 29, 1907.*

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NATAL AGRICULTURAL JOURNAL

AND

MINING RECORD.

Published for and Edited in the Department of Agriculture.

Publishers:
THE "TIMES" PRINTING AND PUBLISHING COMPANY, LIMITED.

1907.

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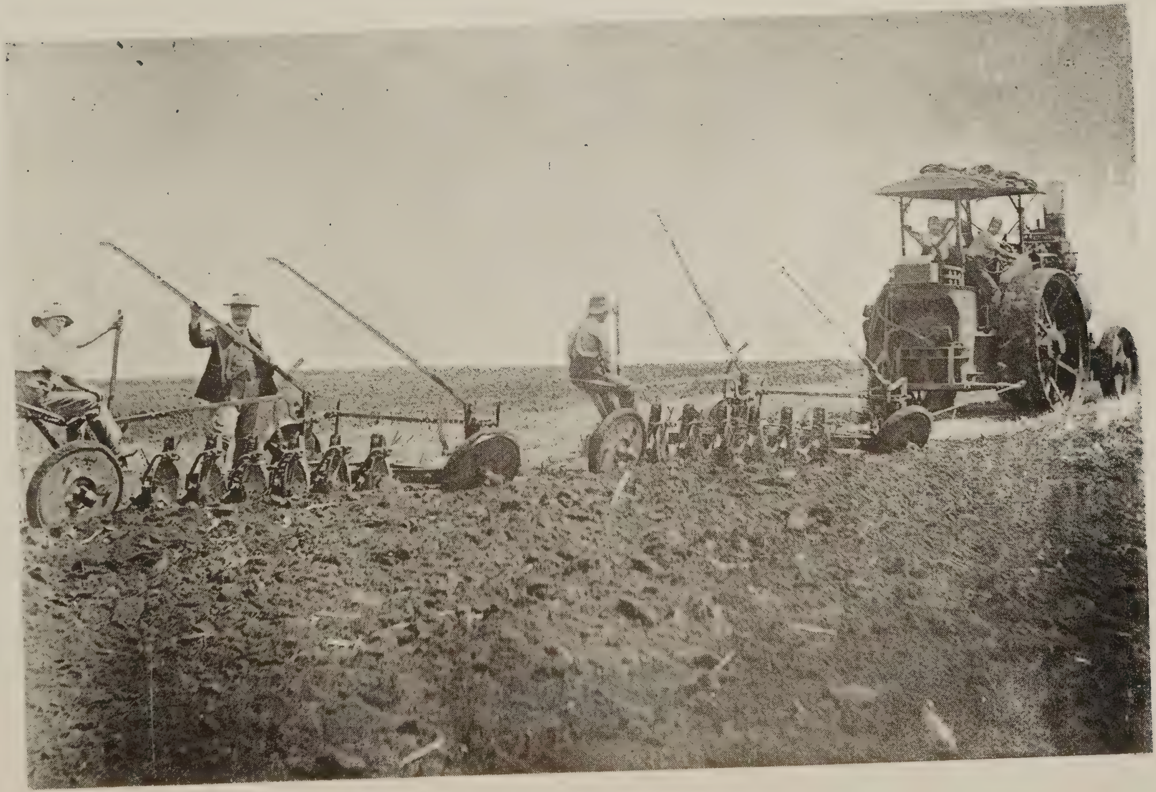


STEAM PLOUGHING AT CEDARA.

Vol. X. No. 11. NOVEMBER 29, 1907.

Natal Agricultural Journal and Mining Record.

Dairying in Denmark.

The almost unexampled prosperity of Denmark—a prosperity, let it be marked, that is not the result of a "boom" in the usually-accepted meaning of the term, but which has developed with an honest, steady growth—has excited the admiration and drawn the comment of every country that has entered or contemplate entering, the struggle of economic life. It is a healthy type of prosperity, and it is perhaps the soundness of it as much as anything that secures for it such a measure of admiration. The Commercial Agent for South Australia (Mr. A. E. M. Norton), who recently made a tour in Europe, and who has furnished to his Government some interesting observations upon that tour, attributes Denmark's prosperity to four main causes: the influence of education; small holdings (by which is meant peasant proprietorship); co-operation; and the judicious assistance given to producers by the Government. First outlining the system of education in vogue, Mr. Norton proceeds to comment upon the progress made by

The Dairying Industry.

In 1876 to 1880 the total output of butter was, we learn, only a little over one million pounds sterling in value; sixteen years later, however, the export figures had reached over four and a half million pounds sterling, and now the output of co-operative dairies can be considered as over eight million pounds sterling per annum.

One of the largest farms visited by Mr. Norton was Bregentved, near Hasle, the property of Count Moltke. At the time of his visit there were 283 cows, chiefly of the Red Danish breed. The food used there is hay mixed with oats and barley, cake, beans and roots. The calves are fed with new milk until about three weeks old, when they are gradually used to skimmed milk and later on to roots and hay. The cows are in stalls in rows, with passages between, along which the fodder is passed, and troughs are arranged for the cake, etc. There is always a constant supply of fresh water. At the head of each cow was a card setting forth the daily quantities of milk given, in pounds, the percentage of butter-fat, annual quantity of milk given, and other necessary data—as regards calves, etc. The cards were all numbered, and the corresponding number was burnt on the cow's horns. The cow that held the record for quantity of milk was six years old. Last year she gave 11,838 ℔s. of milk, or 1,183 gallons, an average of 40 ℔s. milk per day, with a percentage of butter-fat of 3·8 The record for butter-fat was held by a cow giving 35 ℔s. per day, with a percentage of 4·5. The average yield of milk per cow on this farm varies from about 8,000 to 11,500 ℔s. per annum, and the average annual value for each cow is about £15 sterling. This herd is housed nine months out of the year. The milk from the farm is sent to the Trifolium dairy.

TESTING THE HERD.

The importance of knowing the value of each cow as a milk-producer is fully recognised by the Dane. After years of ups and downs, experience began to teach him that it did not pay to feed "wasters." The fact that a cow gave milk was not in itself sufficient to warrant wasting food on her, as is often done in other countries. The Dane wants to know if the value of the milk given by this or that cow is sufficient to pay for her keep, and still leave a margin of profit for the keeper.

To this end, some thirteen years ago, Mr. Norton says, a very excellent and what has proved to be a most satisfactory system has been carried out of testing each cow. For this purpose farmers have formed themselves into societies. These societies employ practical men, who spend a given time at intervals on each farm belonging to the members; they test the quality and the quantity of the milk given by each cow, so that any member can know exactly which pays him to keep and which must go. Each society receives a subsidy from the Government. "It would be a rare thing, I think," remarks Mr. Norton, "to find a farmer in the whole of Denmark who did not belong to some such society."

In our September issue we referred to the advantages accruing to the dairy farmer from the keeping of proper records of the performances of his cows, in an article based upon a Circular issued by the United States Bureau of Animal Industry; and we would refer the reader to that article for an idea of United States opinion on the matter.

CO-OPERATIVE DAIRIES.

The most important co-operative dairy in Denmark, Mr. Norton says, is the Trifolium, at Hasle, which is said to have cost over £40,000. Last year this dairy received nearly 50,000,000 ℔s. of milk, equal to 5,000,000 gallons. Butter-making is the principal feature, although a large quantity of cheese is made.

As is the case in all Danish dairies, the milk is carted by the factory itself, specially-constructed wagons being used for the purpose, each one capable of carrying up to 4,000 lbs. of milk. There are six or seven separators working, each with a skimming capacity of something like 2,400 lbs. per hour. There is also an ice-making machine, of a capacity of 100 lbs. per hour. The butter-making department was a feature particularly worthy of note—the beautifully fitted-up, well-ventilated and lighted room, with the suitable dress and the business-like attitude of the workers. At the time Mr. Norton visited it, the dairy was paying about sixpence per gallon for milk: the average price for the year is a little under that amount. It was stated that it took about 20 lbs. of milk to make one pound of butter.

Another very important institution which was visited was the Copenhagen Dairy Society's establishment, which is described as "the most remarkable institution of its kind in Europe." The origin of the institution dates back some thirty years, public attention having been drawn to the bad feeding and stabling of cows and its fatal influence on milk, and also the fact that the milk was often watered and adulterated. The society devoted itself to remedying matters, taking the following as its principal aims: (*a*) to take only milk provided from healthy cows; (*b*) to ensure scrupulous cleanliness in handling milk; (*c*) to keep the milk perfectly fresh by ice, so that when it reaches the buyer it has not suffered in value or purity.

At the present time the Dairy Society employs seven veterinary surgeons, who go every fifteen days to the farms and carefully inspect each cow. The inspectors are given sheets to be filled up by the society to indicate the number of cows that are ill or resting, and to give all particulars. The milk is filtered by a special process.

It is attention to such details, the importance of which is often underestimated, that has helped to place Denmark in the foremost position she now holds as a producer of dairy cows. Co-operation has accomplished much, but co-operative principles will avail little if the factors which go to establish purity and first-rate quality are not taken into account.

The beating of drums has been found efficacious by a correspondent of the *Country Gentleman* in clearing out a rat-infested farm near Washington, Pa., U.S.A. Rats were so numerous that they ate the fodder and nipped his cattle. He engaged four friends to help him, and they beat five snare drums about the house and farm buildings, causing the rats to scatter. It is stated that not a rat has been seen about the place since.

Mealie Export.

THE exportation of mealies this season has been attended with gratifying results, but there are various improvements necessary in our methods—as might be expected—the adoption of which will result in the attainment of greater success in future seasons.

Among these improvements may be here singled out a suggestion which has been made by the District Traffic Superintendent, N.G.R., Point (Mr. J. McConnachie) with reference to the introduction of a smaller bag for the purposes of the export trade. The muid of mealies weighs approximately 203 lbs., and is, as will be generally conceded, by reason of its weight awkward to handle and stack. It is further, for the same reason, extremely liable to damage while being loaded and discharged into and from trucks. The heavy weight, moreover, causes great fatigue to the labourers employed in handling the sacks, and consequently it is not possible to get the amount of work from them that might be obtained were lighter packages in use; and in addition it is not possible to stack the heavy bags to anything like the height it would be possible to attain with a smaller and consequently lighter sack.

A trade custom is, of course, very difficult to change, but it may be pointed out that the proposed adoption of a lighter sack would only be for the purposes of the export trade, and would not involve the entire abolition of the muid sack in all branches of the local mealie trade. New bags are in any case necessary for export purposes; and as far as the rapid estimation of the extent of export is concerned, the adoption of a sack weighing, say, one-fourth of the English standard quarter—as Mr. McConnachie has suggested—would permit of the English basis of grain measurement (the quarter) being used, as four sacks of 120 lbs. each would make up one quarter of 480 lbs. The introduction of such a bag would, furthermore, fit in better with the requirements of the English market than our present muid does.

We recommend this suggestion to the attention of our readers, and would be glad to receive expressions of opinion on the matter from those interested.

Whilst we are on the subject of the exportation of mealies, we may perhaps be permitted to draw attention to the necessity for care on the part of farmers in the Orange River Colony in the matter of the bagging of their grain for export. Mealies should be free from refuse of any kind, and should be bagged in good, clean, strong bags, well sewn to withstand the knocking about that they must receive on the journey. The O.R.C. Director of Agriculture has, we believe, promised to give the matter of packing and grading his immediate attention, and there is no doubt that his efforts in this direction will be attended with beneficial results.

The question of careful packing and grading is not only a Natal one —though it affects this Colony considerably as all malies shipped from Durban, no matter what part of South Africa they may originally have come from, are looked upon in England and on the Continent as Natal grain—but it is also a South African one; and it consequently behoves all who intend taking part in the general tendency to export overseas to put their best efforts into the promotion of an export trade in grain on the soundest and most up-to-date lines.

Notes and Comments.

CAPE WINES FOR CANADA.—It's an ill wind that blows no one some good. A special telegram in the *Natal Mercury* at the end of October stated that, according to advices received from Canada, there is a splendid chance in that country now for Cape wines and brandies, as the French Canadians have decided to boycott French wines on account of the religious outrages in France, and the Protestants have joined out of sympathy.

FARMING OUTLOOK IN BASUTOLAND.—A *Reuter* telegram from Maseru states the present outlook for farmers and natives in Basutoland is serious owing to the dryness of the ground. Consequent upon the lack of rain they are unable to plough. The early mealies and Kafir corn are nearly all destroyed by worms and insects. Most farmers and natives are therefore re-sowing. Rain is further required to ripen the mealies before the frost falls, also for wheat in the ear; otherwise, it is stated, the later crop will be a failure.

BERGVILLE LUNGSICKNESS INFECTED AREA.—The area comprised by the farms "Woodford," "Hortonradford," "Lytton," "North Dalton," "Bethuny," and that portion of the farm "Roodebuldt" owned by Mr. D. D. Newton, and marked off by red flags, in the Magisterial Division of Bergville, has been proclaimed (Proc. 53, 1907), an infected area within the meaning of the Lungsickness Prevention Act of 1897. The removal of any cattle from that area, whether the same are or are not infected with lungsickness, is accordingly unlawful, the penalty for an offence being a fine not exceeding £20, or imprisonment, with or without hard labour, for a period not exceeding three months.

New Nitrate Beds in Chili.—The Minister of Finance of Chili has declared in the Senate that the rumour current in Europe of the impending exhaustion of the nitrate supply was unfounded. He stated that deposits had been discovered at Antofagasta and Tocopilla as rich as the original deposits at Tarapaca.

Packsaddle for Milk Transport.—A packsaddle for the conveyance of milk and cream, which should prove of interest to farmers and others, is at present on view at the offices of the Department of Agriculture. Those desirous of examining it should pay a visit to the Department, where it will be shown to them. In the December, 1906, number of the *Journal* (page 1,138) will be found a note by Mr. E. O. Challis (together with an illustration) on the transport of milk in hilly countries, in which reference is made to this saddle.

A New Box-Making Machine.—A new automatic box machine has been invented by Mr. George B. Parker, a Californian. According to the *Californian Fruit Grower,* the machine resembles the linotype not a little in its operation, and occupies a floor space 6 x 8 feet in area. The box shook is fed into the machine automatically from the four sides and the top, the machine assembles the several pieces, and when they are in place 34 plungers drive the nails in. These are fed through copper tubes much in the same manner that matrices are assembled in the linotype. The nail is held firmly in place until it is nearly driven in the wood, reducing the possibility of the nail bending to a minimum. The operation completed, the box is pushed on to a chute which carries it to the packer. The machine requires two men to run it, and turns out boxes at the rate of about fifteen per minute.

East Coast Fever.—The Minister of Agriculture has cancelled the order contained in Government Notice No. 235, 1907, of the 20th April, which declared that portion of Natal, defined as follows, to be an infected area within the meaning of the East Coast Fever Act: That portion of the Colony of Natal bounded on the East by the Main Line of Railway from the Point to its junction with the Cape-Natal Line at Pietermaritzburg, on the North by the Cape-Natal Line as far as Creighton, thence by the Railway fence to its junction with farm No. 35, thence by the fence running to farm No. 36, thence by the dividing fences between the farms 35 and 36 and 38 and 39 to the Umzimkulu, on the West by the Umzimkulu River, and on the South by the Indian Ocean. The movement of cattle into and from this area will, therefore, in future be permitted. The effect of this notice is to permit of the movement across the Cape-Natal line; but it in no way affects the existing Government Notice quarantining the Alexandra, Ixopo, Richmond, and other districts south of the Cape-Natal Line.

Destruction of Locust Eggs.—A telegram received by the Department of Agriculture from Mount Edgecombe states that, notwithstanding the fact that the invasion of locusts this season is the heaviest experienced for many years, various maggots and diseases have destroyed practically all the eggs laid, and there are consequently no young locusts hatching in the locality.

Natal Mealies for Canary Islands.—Reliable information received by the Government goes to show that there is a good prospect of Natal mealies being imported into the Grand Canary; and negotiations are being entered into with leading merchants at Las Palmas with a view to establishing an export trade to that country. Natal mealies are apparently viewed with favour by representatives of houses in the Grand Canary; and it is probable that a considerable export trade in our grain with that country will be the outcome of the Government's efforts.

Food Value of Sugar.—According to the *New England Grocer,* a noted English physician considers that everybody should eat a quarter of a pound of sweets daily. "Nothing is more strengthening," he says, "than sugar. It is possible to work for hours after eating four ounces of chocolate without feeling the slightest fatigue. If I had my way, every soldier in the British army would be allowed a quarter of a pound of sweets every day. My practice is to take five or six lumps of sugar in every cup of coffee or tea." The old belief was that sweets of all kinds were bad as food and interfered with digestion. But we know now that they are real food, and are especally good for us when we are fagged out nervously. Children are unceasingly active, and they always crave something sweet. The craving comes from an actual bodily need.

Apiculture.—In our correspondence pages will be found an interesting letter on apiculture from a correspondent signing himself "Observer." The awakening to be observed in Natal to the advantages of bee-keeping is indeed a pleasing sign and promises well for the future. Apart from the pleasures of bee-keeping as a hobby, viewed from a financial standpoint no industry perhaps approaches it in the profits on the outlay, when the time spent on the work in the apiary is taken into consideration. The bee-keeper has only to provide a home for his bees, and receptacles in which they may store their surplus, and they will roam afield, gathering honey in abundance from morning till night. But as our correspondent points out, modern appliances are necessary if the best results are to be obtained. We shall be glad to hear from other readers of the success or otherwise which has attended their efforts in this interesting and profitable industry.

GINGER.—A report received by the Cape Government from the Cape Trades Commissioner in London, states that the crop of green ginger this season is an exceedingly small one, and that the article is accordingly expected to become very scarce. The usual wholesale price is 1s. per ℔., while the article is now commanding 1s. 9d.; the retail price being 2s. 6d. per ℔.

GRANTS TO AGRICULTURAL SOCIETIES.—In consequence of the heavy expense to which the Government has been put in guarding the Colony against East Coast Fever and in destroying locusts, and of the extremely difficult financial position in which the Colony finds itself, the Government has been compelled to withhold the payment of further grants to Agricultural Societies in respect of their annual shows, after those due in respect to Shows held last season have been paid. A circular to this effect has been sent to the secretaries of the various Agricultural Societies by the Minister of Agriculture.

MOLASSES AND CATTLE TICKS.—According to the *Louisiana Planter,* experiments made at Brisbane (Australia) with some valuable dairy cattle have shown that the consumption of molasses by the dairy cattle was in some manner inimical to the existence of cattle ticks. In the Logan district a farmer had kept his cattle free of redwater by giving them molasses; and this report led Mr. Thurlow, of Brisbane, to experiment with dairy cattle. He prepared for them a solution of water and molasses, about half and half, to which the animals went with freedom, and ever since all of the animals, it is stated, were free from ticks. The proportion of molasses was subsequently reduced and even then it was found quite effective in keeping the stock clean. No difficulty is reported in developing a taste for the molasses and water and the use for the purpose of freeing animals of ticks is considered now as a demonstrated success. Mr. T. W. Crawford, of the Mossman Central Factory, reported that a good deal of trouble had been experienced with ticks among the dairy cattle at that centre, and to so great an extent that at one time they were reduced to the use of condensed milk exclusively. They then hit upon the idea of an external molasses wash, using two parts of water to one of molasses. The cows were smeared with this mixture and it was said that every tick on the animals was dead by the following morning and that now they have no trouble with the ticks at the mill. It is even said that molasses is superior to the ordinary cattle dips used for killing ticks, as the molasses kills the ticks almost immediately and the standard cattle dip takes several days. Further, it is not necessary to take any precaution against animals licking themselves, as the molasses does them more good than harm. Incidentally, it is stated that in milking a smeared cow, it is only necessary for the operator to throw a bag over the animal's loins, against which he can rest his head.

Exportation of Ostriches.—In most of the Colonies and Protectorates of South Africa laws are now in force regulating the exportation of ostriches and ostrich eggs on the lines similar to those of the Nātal Act passed last Session. The Orange River Colony Government intends introducing an Ordinance on the subject during the December Session of Parliament, and the High Commissioner for South Africa intends issuing proclamations in Basutoland, Bechuanaland Protectorate, and Swaziland, prohibiting, under penalty, exportation of ostriches or their eggs, to take effect from 1st December.

Sumatra Tobacco in U.S.A.—The Acting British Consul at Savannah (Mr. A. Harkness) reports, according to the *Board of Trade Journal,* that the culture of Sumatra tobacco has grown to considerable proportions below Bainbridge, in Decatur County, Georgia, and around Quincy, Florida, about twenty-five miles east of Bainbridge. This tobacco sells for fancy prices and is mostly shipped to factories in the north, to Tampa and even Cuba. There is said to be no better wrapper grown than is produced in that section of Georgia and Florida. It is reported that a company has been organised at Madison, Florida, with a capital of 50,000 dols., for the purpose of cultivating Sumatra tobacco on a large scale; stores and warehouses have been secured and 160 acres of land purchased to be planted with tobacco. It is also reported from Jesup, in Wayne County, Georgia, that successful experiments in tobacco growing have been made there this year, and it is expected that a company for extensive tobacco culture will be formed in that county next year.

Turnip Manurial Experiments.—Experiments with fertilizers in the cultivation of turnips, undertaken by the West of Scotland Agricultural College under the supervision of Prof. Wright, have established that superphosphate forms a more effective manure for the turnip crop when applied in the drills in spring than when broadcast on the land in winter, and a similar effect has been observed with the use of basic slag upon the same plan. Kainit and the other potash manures also generally, though not invariably, give the best results on the turnip crop when applied in the drills in spring. The relative efficacy of the winter and the spring application has been found to vary with the season; in some years the spring application may be only moderately, if at all, superior. Potash appears to be of nearly equal efficacy for the turnip crop in the three forms of kainit, muriate of potash, and potash manure salt, but kainit is somewhat the more effective form of the three. Lime nitrogen appears likely to prove a valuable nitrogenous manure for the turnip crop; but more experiments are desirable as other experiments seem to show that the new nitrogenous fertilizer is not so suitable for roots as sulphate of ammonia or nitrate of soda.

A Bacon Factory for O.R.C.—We learn from the *Wynberg Times* that it has been decided to erect a modern bacon factory at Ladybrand, in the Orange River Colony, from the designs of Messrs. Wm. Douglas and Sons, Ltd., of Putney, London. The factory will have all the modern equipment found to be suitable in European factories. The inception of the idea is due to the Hon. W. J. Palmer, M.L.C., Director of Agriculture of the O.R.C., and the proprietor is the Hon. H. W. Stockdale, M.L.C. The whole of the plant necessary will be made and fitted up by the designers of the factory.

A Celebrated Persian Ram.—In this issue we publish an illustration of a celebrated Persian ram, for the original photograph of which we are indebted to Mr. Chas. W. Holmes, Maritzburg, Natal agent for Mr. Hougham Abrahamson, Long Hope Siding, Cape Colony, the breeder and owner of this famous ram. This ram—which is registered in the Auxiliary Stud Book of the Cape Stud-Breeders' Association—has, we are informed, taken first prize at all the agricultural shows exhibited during the last three years, those at Grahamstown and Port Elizabeth being the principal ones. He may therefore be safely allotted first place in the quality of this particular breed. A few years ago Persian sheep were practically unknown in South Africa, but lately there has been a great inclination among our farmers to go in for this class of sheep, they being in many respects profitable. Should any of our readers desire further information respecting Mr. Abrahamson's flock we would suggest their communicating with the local agent.

Molasses and Fire.—A writer in the *Bundaberg Mail* (Australia) draws attention to the fire-extinguishing properties of molasses. He states that, having occasion some time ago to scientifically investigate the properties of molasses, he found it a very difficult problem to burn off a large quantity of surplus molasses without the aid of specially constructed furnaces. Molasses is not, he says, the highly inflammable mixture that people imagine it to be, and goes on to remark that it would be practically impossible to set a tank of molasses on fire by any means whatever. Even a mixture of molasses and methylated spirits or sulphur will burn very imperfectly at first, and finally smolder and die out. A charge of molasses will extinguish or damp down the strongest furnace fire in a few minutes. A jet of molasses played on burning wood will instantly extinguish the fire, and the wood cannot be again fired until the molasses is removed from the surface. For extinguishing large tanks of burning oil, kerosene, or spirit, there is nothing more effective than bags or tarpaulins steeped in molasses, and when such tanks are in danger of being fired they should be covered over and made air-tight with tarpaulins that have previously been immersed in heavy molasses.

A POISONOUS PLANT (*Urginea lilacina*).—Some specimens of a wild plant (*Urginea lilacina*), reported to be very deadly to cattle, were recently forwarded to the Minister of Agriculture for examination. It was stated that, in one troop of 26 cattle, 24 head were lost through poisoning by this plant. The specimens were sent to Mr. Alex. Pardy, the Analyst at the Central Experiment Farm, who states: "The plants had a rootstock of scales forming a bulb and in general appearance resembled an onion. When cut the bulb was found to be of a white colour, with little or no odour, slimy to the touch, and almost tasteless. I was able to separate out a gummy material and also a toxic principle of a glucosidal character, either scillitoxin or an allied substance. This is stated to be an asthenic and a powerful heart-poison." Mr. Pardy says that the bulbs contained nearly the whole of the glucoside, the stem and modified leaves being found to contain only small quantities. He is unable to state what specific antidote is used for this poison, but from its reactions he suggests tannin (infusion of wattle bark) and also the use of an emetic.

DISEASED POTATOES AS STOCK FOOD.—The large percentage of diseased tubers in the British potato crop this season has brought up the question of the value of such diseased potatoes as stock food. In the London *Times* in October it was remarked that "diseased tubers are useful as pig food and are an asset of appreciable value," to which statement a correspondent, in a later issue, took exception. Referring to a report of the "Kaiserliche Biologische Anstalt fur Land und Forstwirtschaft," of February, 1907, which dealt with results obtained in some feeding experiments with diseased potatoes, he pointed out that the experiments proved that the diseased tubers, although in small quantities in the raw or boiled condition they showed no injurious effect on the cattle and pigs experimented upon, when given in large quantities produced slight attacks of diarrhoea. His own observations, however, had shown that the degree of the digestive organs largely depended upon the degree the tubers were diseased, and that in some cases, especially with younger animals, the effect might be more serious than that set forth in the experiments alluded to. The diseases present in the tubers used in the experiments were caused by two well-known parasitic micro-organisms—*i.e.*, *Bacillus phytophthorus* ("wet rot") and *Phytophthora infestans*. "Quite apart from the question of unwholesome fodder," the writer in the *Times* concludes, "it is proved beyond doubt that the parasitic mode of life of these micro-organisms reduces considerably the nutritive value of the tubers, and I would, therefore, suggest that the diseased portions be cut away and badly-diseased tubers be not used on any account. Healthy and well-thriving animals would be sufficient compensation for increased labour."

A NEW SWEET POTATO.—We learn from an American paper that the Californian experiment station at Berkeley has come into possession of a new sweet potato. Macomber's sweet potato, it is stated, is white-fleshed, and was obtained on Pagan Island, one of the Ladrone group, by Capt. J. A. Macomber, of Oakland. Capt. Macomber was struck with the delicate flavour of the tuber, and when leaving Pagan Island took a supply of tubers aboard his schooner for consumption on his voyage. He noticed that the tubers had splendid keeping qualities, and upon his arrival in California in November, he kindly donated what tubers he had left to the experiment station of the University. The tubers when received were in a remarkable state of preservation, notwithstanding the fact that they had been lifted in April, some eight months before. The tubers donated by Capt. Macomber have been propagated, and a limited number of tubers secured for distribution. It is stated that the tubers yield many more cuttings than does the ordinary type, and that quite a large number of plants can be secured from a single tuber if properly handled. It is a very prolific variety, with tendency toward deep growth of large tubers. Trial will, of course, be necessary to determine its cultural and market value.

A NEW CORN EXCHANGE.—Messrs. Reid & Acutt's announcement in the daily press of their intention to establish a public market in Durban for mealies "in order that farmers generally may be kept in constant touch with the actual state of the market from time to time, and thus avoid the uncertainty as to the ruling prices which has hitherto resulted from their having to rely solely on 'private offers' for their produce," will doubtless be received with interest by all connected with our newly organised mealie export. Messrs. Reid & Acutt's proposal is to establish a regular system of public auctions on the same lines as in the case of wool and other produce. Catalogues are to be distributed amongst all the local buyers, each sale being duly advertised in the daily papers so as to ensure the attendance of every purchaser, whether speculator, miller, shipper or otherwise, and thus secure the maximum price obtainable. It is stated that all produce will be sold for spot cash (within twenty-four hours) as in the case of wool, hides, bark, etc., and account sales with remittance rendered the following day. In all cases where reserves are not reached, customers are to be advised of the prices offered immediately after the sales. They will then have the option of either holding over for a future sale or shipping on their own account, as they may decide. Arrangements have, it is stated, been made with experienced agents for dealing with such consignments, either in London or on the Continent, at moderate rates. We would suggest that those interested should place themselves in communication with Messrs. Reid & Acutt (P.O. Box 89, Durban), who would doubtless be pleased to send a copy of their circular on the subject.

RETRENCHMENT.—As most of our readers are now probably well aware, the Government has been unavoidably compelled, by the stress of financial circumstances, to turn its attention to the question of retrenchment on a large scale in the various Departments of the Public Service. The Ministerial Department of Agriculture has been the first to come under the pruning knife, those of the scientific staff to be retrenched being District Veterinary Surgeons Donaldson, Beckett, Cordy and Webb, of the Veterinary Department, and the Conservator of Forests and District Forest Officer, Lower Natal. Mr. Woollatt, the Principal Veterinary Surgeon, has also severed his connection with the Department, his name having been, at his own request, placed at the head of the list of those to be retrenched, as he felt that he could not continue his work in a satisfactory manner with a staff reduced to such an extent. Mr. Power, we understand, takes Mr. Woollatt's place as Chief of the Veterinary Division; while Mr. Harber, lately officiating District Veterinary Surgeon at Greytown, has been transferred to the Government Bacteriologist's Department. Mr. Claude Fuller (Government Entomologist) and Mr. E. R. Sawer (Director, Experiment Stations) take over Mr. Sim's duties—the former those connected with fruit culture, etc., and the latter those dealing with forestry.

DESTRUCTION OF HOMING PIGEONS.—Homing pigeons have a large circle of admirers in South Africa, and there are in existence several clubs which annually organise races for test purposes. The season is now in full swing, and several races have taken place. Unfortunately, however, many birds are being lost through indiscriminate shooting by farmers and others over whose land the birds pass. A man out with a gun often does not hesitate to shoot at any bird that happens along, and through his carelessness he often lays low one of our favourite "homers." In times of peace the shooting of these birds is nothing short of shameful. Where humanitarian views exercise no effect, however, the law steps in; and consequently it may be advisable to draw attention to the fact that these birds are protected by an Act of Parliament passed during 1904, viz., Act No. 13, 1904, "to amend Act No. 33, 1896, entituled Act 'For the protection of certain insectivorous and other wild birds.'" By this Act, homing or carrier pigeons are added to the schedule of protected birds in the original Act. By the provisions of Act No. 33, 1896, no person may "kill, catch, shoot at, or attempt to kill, catch, or aid in killing, catching, or shooting at" any of the birds specified in the Schedule to the Act, and no person may "at any time take, injure, or destroy the eggs of any of the said birds, except by express permission of the Governor for the purposes of scientific research." The penalty for contravening any of the provisions of this Act is a fine of not less than 2s. 6d. and not more than 20s., or imprisonment, with or without hard labour, for a period not exceeding one month. Any person contravening any of the provisions of the Act "may be detained by any constable, or the owner or occupier of the land upon which trespass is being made, unless he shall, when thereto required, give his full name and address." The penalty for giving a false name and address is a fine of £2. Section 3 of the Act of 1894 reads: "The Magistrate before whom any person is convicted of killing, catching, or shooting at homing or carrier pigeons may, in passing sentence, adjudge such person to pay to the owners of the pigeons the value thereof, or of the injury which may have been done to them, not exceeding Five Pounds Sterling, and any sum so awarded may be levied in execution of the Magistrate's judgment, together with the costs incidental to the levy."

MOVEMENT OF SOIL MOISTURE.—In an interesting bulletin issued by the Bureau of Soils of the U.S. Department of Agriculture, Mr. Edgar Buckingham gives the result of some studies made of the movement of soil moisture. He points out that, although the movement of the water in the soil, whether by the capillary forces exerted in the finer soil spaces at soil surfaces, or by distillation from one point to another, has long been regarded as a very important phenomenon and has often been investigated, nearly all the studies have been concerned with the movement of free water, in practically unlimited amounts, into a more or less dry soil. The much more practical problem of the movement of water from a soil short of optimum content to an even drier portion, or the distribution of the moisture content of the soil under conditions simulating those existing in the field, has hitherto received much less attention. It has become evident, from the studies which have been made so far, that the movement of moisture in the soil under such conditions is very slow—much slower, as a rule, than the growth of roots, which can, in a sense, reach out for needed water supplies more rapidly than the soil can bring the water to them. But while this feature of the problem can now be safely held to have but little if any immediate practical importance, the problem is one of great significance in the long run, especially in handling soils subject to conditions of drought. Mr. Buckingham shows, in his bulletin, that the loss of water by evaporation from points below the surface, while it does take place in measurable quantities, is nevertheless quite small, and is negligible in comparison with the losses taking place at or very near the surface. The movement of water vapour through the soil is shown to follow the law governing the diffusion of other gases through porous media, and is quite slow. Mulching decreases or inhibits the capillary flow, and diffusion through the mulch is practically negligible. This practice is very effective in conserving soil moisture, and is founded on sound scientific principles. An especially interesting illustration is brought out in the comparison of the loss of water from a soil under arid and humid conditions, respectively. As might be expected, the loss at first is much more rapid under the arid conditions—so rapid, in fact, as to overtax the soil's ability to move water from within to the surface by capillarity, and in consequence a dry layer or mulch is formed which keeps the subsequent losses far below those which take place from the soil under humid conditions, where the capillary flow to the surface persists until the moisture content of the whole soil is very low indeed. The laboratory experiments described in the bulletin clear up, therefore, in a very satisfactory manner, the well-known and apparently contradictory facts observed in the field that the soils of arid regions, at depths a little below the surface, are generally wetter and hold their moisture for much longer periods than do the soils of humid areas in dry seasons.

Presentation to Mr. Mullens.

Among the several changes which the last month or two have witnessed in the *personnel* of the Department of Agriculture has been that in the Head of the Department. The designation "Secretary to the Minister of Agriculture" has been abolished and that of Under Secretary for Agriculture created, Mr. H. A. Hime, late Assistant Under Secretary (Colonial Secretary's Department) filling the position.

Upon the occasion of his severing his connection with the Department, Mr. Mullens was presented by the officers of the Ministerial Department of Agriculture with tokens of the esteem in which they have held him, in the form of a beautiful marble clock and an equally handsome tantalus, each bearing a plate inscribed with the following words:—

Presented to

E. T. MULLENS, Esq.,

By the officers of the Ministerial Department of Agriculture, Natal,
upon the occasion of his severing his connection with the Department.

The presentation took place on Friday afternoon, the 22nd November, Mr. Pitchford (Government Bacteriologist) speaking on behalf of the assembled officers of the Department. Mr. Pitchford said:—

"Mr. Mullens, I have been asked by my colleagues of the Department of Agriculture to express on their behalf—and I am glad of the opportunity of speaking for myself also—our united regret at losing you. We all know that during the past years the welfare of our Department has always been a first consideration with you; and while you have been successful in no small measure in promoting the success of the Department, you have at the same time secured the esteem and regard of those officers of the Department with whom you have been associated.

"In asking your acceptance of these slight tokens of this regard, we ask that you will not see in them the measure or extent of that regard but rather look upon them as a permanent record of the friendly relations which will, I believe, always exist between us, and of the esteem in which you will always be held by those who have had the privilege of working with you.

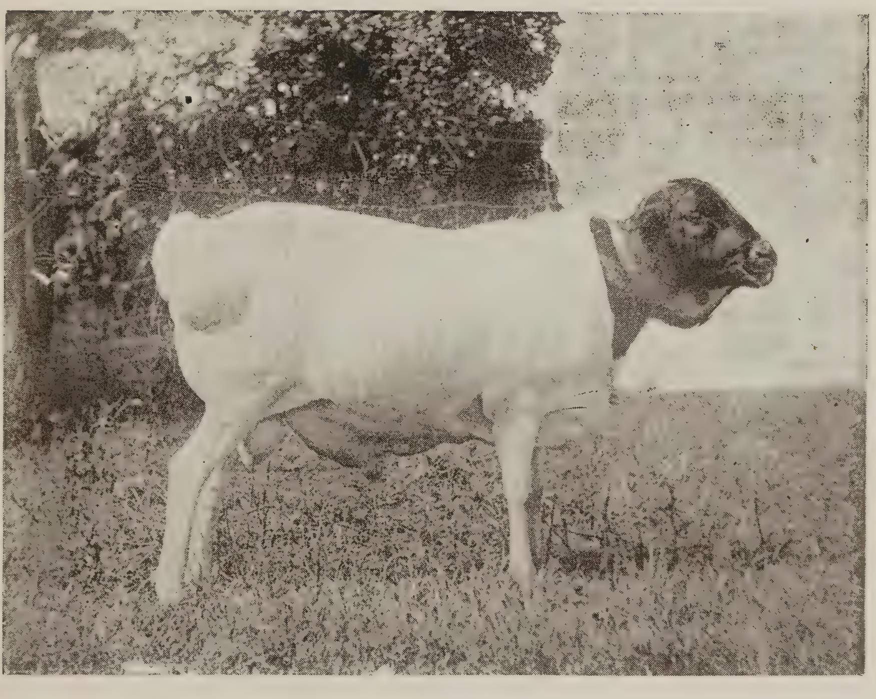
"Our token of appreciation is a representative one as from all the sub-departments of Agriculture, and as such we ask if you will accept and consider it as a representative one."

Mr. Mullens, in the course of his reply, expressed his sincere regret at leaving those with whom he had been for so long associated. He described the principles upon which he had worked, in so far as his relations with the officers of the Department were concerned; and in conclusion he hoped to be able to count upon them all as friends in the future as they had been in the past.

Mr. Mullens was transferred to the Department of Agriculture, as Secretary to the Minister of Agriculture, in October, 1901, having thus served under three Ministers of Agriculture. He takes away with him the respect and friendship of all the officers of the Department, who will unite with us in wishing him success in his new sphere of work.

According to Messrs. Thurle & Skidmore, New York, the United States used in 1906, 103,734 cases of Singapore pineapple, England using in the same year 346,087 cases.

The Santa Fe railway has made arrangements to send a representative to Australia to make a study of the eucalyptus trees of that country with a view to ascertaining their value as sleeper timber. According to the *California Fruit Grower* it is not the purpose of the railway company to import sleepers from Australia, but to study the trees, note the best species and secure seed of those not yet introduced in the United States. The Santa Fe Company began tree-planting last year on a large scale, and will, it is stated, plant 500,000 more trees in Southern California next winter.



A CELEBRATED PERSIAN RAM.
Bred by Mr. Hougham Adamson, Cape Colony.
(See "Notes and Comments.")

Tobacco Cultivation in South Africa.

WITH SPECIAL REFERENCE TO NATAL.

By E. R. SAWER, Director Experiment Stations.

VI.—INSECT PESTS AND DISEASES.

TOBACCO suffers in common with the potato and tomato, to which it is closely related, from the attacks of several widely distributed insect pests and plant diseases, and heavy losses are only to be avoided by the adoption of a regular system of control based upon the habits and life of the individual forms.

COMMON INSECT PESTS.

The Tobacco Leaf Miner (*Lita solanella*) is in the adult stage better known perhaps as the Potato Moth, a small grey insect with delicately-fringed hinder wings which lays its eggs upon the leaves of the tobacco, especially in the seedling stage. The minute caterpillar, as soon as hatched, bores its way into the substance of the leaf and burrows between the upper and lower surfaces, leaving behind it a grey discolouration. In the case of the potato not only the leaf is attacked, but the grub makes its way down through the haulm and pupates in the tuber. The general presence of this pest renders the covering of the tobacco seed-beds with scrim-frames, as earlier suggested, a very necessary precaution. Should the moth appear in the field in considerable numbers, spraying with a solution of Paris Green may be advisable, especially when cigar wrapper is being grown. The grub does not pass its life in one place, but after a time chews its way to the outside of the leaf to enter the tissues again at another place, and this habit renders possible its destruction by means of a poisonous spray.

The Cut Worms, unfortunately too well known to call for much description, are probably the most serious enemy of the tobacco-planter. Hiding by day in the loose soil or beneath rubbish, the grubs, which represent the larvae of several species of moths, come out at night and eat plants at ground level, a habit which has given them their popular name. Their activity is considerable, and a few individuals may ruin the crop over a considerable area in a single night. Preventive measures are far better than doubtful remedies, and should be applied before the tobacco is transplanted. As soon as the ground is ploughed and harrowed, handsful of poisoned bait should be scattered over the surface. In the absence of other food the cut-worm will travel considerable distances, and almost certainly consume the poison The bait may be prepared by mixing 1 ℔. of Paris green with 50 ℔. of fresh horse-dung or bran, the mixture being moistened with water and treacle. As an alternative, bunches of any green stuff may be sprayed with the Paris green solution and similarly distributed with equally satisfactory results.

The Tobacco Hornworm (*Sphinx sp*) is also a pest of the potato and tomato. The large green caterpillar, with whitish oblique stripes, gains its name from the horn seen on the hinder part of the back. The worm, as it comes from the egg, is very minute, but has a voracious appetite and rapidly grows to a length of about 4 inches. When full-fed it burrows into the earth, and pupates as a brown-coloured chrysalis with a curious projection like a jug-handle. The moth or perfect insect is of large size with wing-spread of about 5 inches, of a grey colour with five orange spots on each side of the body. Both moths and caterpillars should be systematically destroyed by hand-picking or through the agency of turkeys in the latter case, which is rendered the easier by their large size. If their ravages are very extensive this method should be supplemented by spraying with the Paris green solution.

The Eelworm is a very minute, white and almost invisible soil and root-infesting pest, which shows little or no discrimination in its choice of food-plants. Of recent years tobacco-planters in many parts of South Africa have suffered considerably from this cause, and have found control of the pest a matter of great difficulty. When their roots are attacked by the worm the tobacco-plants wilt and die, frequently without the true character of collapse being detected. The removal of the plantation to a new site is generally to be recommended, though some success has been secured from the application of a commercial insecticide known as "Vaporite." This should be broadcast at the rate of at least 300 ℔. per acre, and ploughed under some time prior to transplanting the tobacco. As a less certain alternative, a root-crop, such as carrots or turnips, may be planted with the first rains and pulled early in the season, and the worms thus removed in the roots prior to egg-laying. The crop, however, cannot safely be fed to stock, for it has been shown that the pest pass unchanged through animals and re-infest the land if the manure be distributed.

Plant Diseases.

Wilt Disease (*Peronospora hyoscyami*) is of not infrequent occurrence in the seed-beds, and, once established, will almost inevitably destroy all seedlings present. The avoidance of a damp situation, the preliminary burning over of the beds and constant attention to their ventilation and occasional sunning should obviate danger from this cause.

Macvosporium Disease (*M. solani*) is probably caused by the same fungus as is responsible for the so-called "Leaf Blight" of potatoes. The brownish areas with concentric structure, characteristic of the disease, are to be seen in almost any tobacco field at the end of a wet season, and it is only exceptionally that the quality of the crop is materially impaired. Where, however, there is any appearance of the disease spreading unduly, it may be held in check by the application of dilute Bordeaux mixture. It should be remembered that the fungus frequently continues to develop during the earlier stages of curing, and a final spraying shortly before harvesting is frequently desirable. Wrapper leaf should in particular receive such protection from possible damage.

Mildew or White Rust (*Oidium tabaci*) is occasionally a cause of damage in the seed-beds, in which case a dusting of sulphur should be resorted to. The treatment is unavailable, however, in the field, affecting, as it would do, the burn of the leaf. Attention to the drainage of the plantation, and the "priming," or removal of the lower leaves, of the plants, to allow free passage of air will generally be sufficient to prevent serious loss.

Mosaic Disease causes the leaves to grow more rapidly near the veins than elsewhere, and derives its name from the mottling of the lamina caused by the presence of alternating lighter and darker areas. Affected leaves become wrinkled and corrugated by irregular development, and consequently worthless for wrappers, and, indeed, for any purpose if highly diseased. Recent investigations go to show that the phenomenon is due to defective nutrition of the young growing leaves, owing frequently to a lack of nitrogenous food. The avoidance of injury to the roots in transplanting and cultivation, and the provision of suitable fertilisers or manures appear to be the only means within the reach of the planter for the prevention or modification of this condition.

"Frog Eye" is a term commonly used to denote the presence of small white specks in the tissues of the leaf, which are probably bacterial in character. The market has at times demanded this feature in cigar wrappers, and it has rarely been regarded as a disadvantage. No successful treatment for its prevention is known.

THE PREPARATION OF SPRAYING SOLUTIONS.

A knapsack pump and stock of spraying materials should be regarded as essential items in the tobacco-planter's outfit. Paris green, copper sulphate, soft soap and supplies of freshly-burnt lime are the required ingredients. A set of wooden tubs or barrels should be kept for this purpose. Both Paris green and the copper sulphate should be brought into solution by suspending the required quantity in a course gunny-bag in a barrelful of water. The lime, which must be freshly burnt, should be slaked in a separate barrel, by the repeated addition of small quantities of water until a fine, smooth paste is secured. If kept covered with water this may be employed for a considerable time. After slaking is completed, water is added to the paste to bring the whole up to 28 gallons, and the lime water poured gradually into the solution of copper sulphate or Paris green, the mixture being continually stirred to promote combination. The following proportions should be observed:—

Paris Green Spray.	*Bordeaux Mixture.*
1 ℔. Paris green.	6 ℔. copper sulphate.
2 ℔. quick lime.	6 ℔. soft soap.
250 gallons water.	4 ℔. quick lime.
	40 gallons water.

The Bordeaux mixture should always be tested before application by insecting a clean knife blade into the solution. If the steel becomes discoloured a further quantity of lime water should be added. The addition of soft soap greatly increases the adhesive qualities of the spray. Paris green is not readily soluble in water and should be constantly stirred during use to prevent precipitation. Many spray pumps are provided with an agitator for this purpose. The sprays are preferably applied in the early morning after rain, and should not be used during the heat of the day. The number of applications necessary to afford complete protection will be determined by the character of the rainfall.

The Zimmerman Fruit-Evaporator.

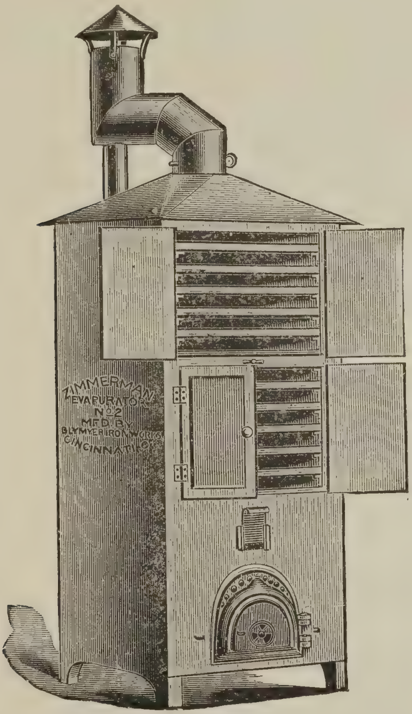
THE accompanying illustration of a fruit evaporator will doubtless prove of interest to readers of Mr. E. R. Sawer's article on Fruit Drying and Evaporating in the last issue of the *Journal.* The particular evaporator shown is the Zimmerman (No. 2 type). Both Nos. 1 and 2 are designed for family use, but the No. 2 has a capacity sufficient to dry for market. The latter measures 24 inches deep by 26 inches wide and 5½ feet high. It is furnished with twelve galvanised wire trays, giving over 40 square feet of drying surface. Both Nos. 1 and 2 are made substantially of galvanised iron. The furnace front and back are made of heavy cast iron, and the body of the furnace of No. 18 boiler iron.

The following table gives the minimum capacities of machines Nos. 1, 2 and 3; which capacities can, it is stated, in each case be increased by attention and effort;—

CAPACITY PER DAY OF 24 HOURS.

Green Fruit.	No. 1. lbs.	No. 2. lbs.	No. 3. lbs.
Apples	150 to 200	300 to 350	750 to 1,000
Apricots	100	200 to 300	400 to 700
Peaches	100 to 150	200 to 300	400 to 700
Pears	125	250 to 350	500 to 800
Plums	100	200	500
Prunes	100	200	500

The agents in Pietermaritzburg are Messrs. Steel, Murray & Co.



ZIMMERMAN EVAPORATOR No. 2.

To make whitewash, slake one bushel of fresh lime with hot water. While slaking add one pound of glue previously dissolved in warm water and stir thoroughly. Before applying add sufficient bluing to give the tint desired. This whitewash is good for both inside and outside work.

Tree Culture.

LECTURE BY MR. T. R. SIM.

A MOST interesting and instructive lecture was delivered recently in Charlestown, under the auspices of the Public Library, by Mr. T. R. Sim, F.L.S., Conservator of Forests, writes the Charlestown correspondent of the *Natal Mercury.* The title of the lecture was "Tree Culture"; and, to those who attended, it was an education of the highest advantage. Dr. Briscoe, the President of the Library, presided, and introduced the lecturer.

Mr. Sim said that, although Charlestown had been spoken of as a bleak place, he had seen enough in the town and around the district to know for a certainty that trees did, and could, grow. It was for them to remember one or two things. The first thing was the

CLIMATIC CONDITIONS

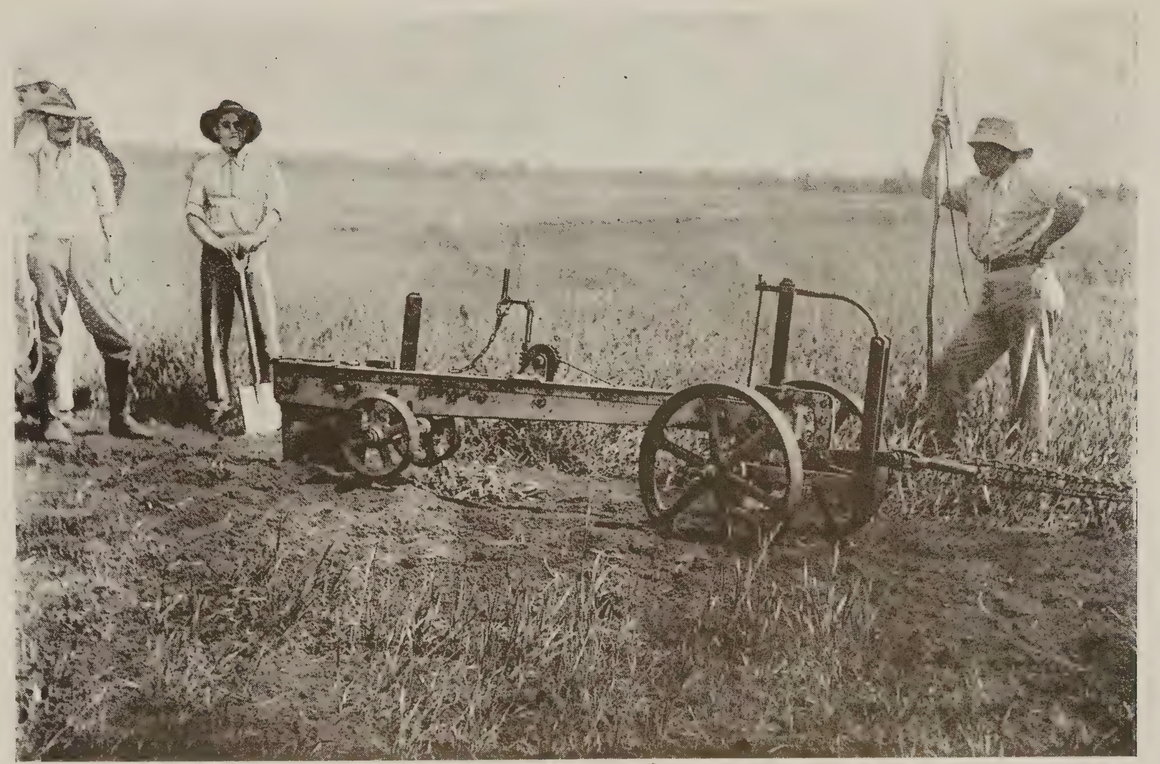
of a locality, this being the key to the whole question of tree culture. He then showed a sketch indicating the different altitudes of Natal, taking the first from the Coast to Botha's Hill, the second to Manderston, the third up to Hilton Road, the fourth to Highlands, then at Wessel's Nek, and up to Lang's Nek. The lecturer showed that on the eastern sides of these heights the moist winds from the Coast produced a more favourable condition for the growth of trees than on the western slopes of the same ridges, and one of the causes why so many failures had been made in tree planting at Charlestown had been the ignoring of this fact.

The fact that forests beget forests was apt to be lost sight of, and it would be found that the more trees one could get to grow, the easier would it become to grow a larger quantity. Generally speaking, Coast trees were poor in quality for useful woods, while the upper and midland districts produced good wood, and ought to produce much more.

Another essential requirement to the successful growth of trees was the

SELECTION OF SOILS

suitable for the various kinds of trees to be planted. The next thing was to select trees which had as nearly as possible come from a similar country or district. For instance, Australia in many parts was similar in climate and soil conditions to Natal, and it was found that most of the trees native to Australia would grow in Natal. California also being similar, the trees from there would mostly grow in Natal. The hardier fruit trees of England and North America were somewhat similarly to be regarded, such as apples, pears, plums, etc., more especially in the upper districts of the Colony, although the dry winter militated against them to some extent.



MOLE PLOUGH IN ACTION.

Regarding trees for Charlestown district, the lecturer gave the names of three gum-trees, all of which could be planted with safety in the district, and all of which resisted the frost.

WATTLE PLANTING

in the town would not, in his opinion, be a success, but he had seen places within ten miles of Charlestown which ought to be bearing plantations of wattles, which would bring a rich yield. The *Pinus insignis* was a tree which, in spite of wind, could be safely planted, and become a beautiful, as well as a useful, tree. The cedar he had seen doing well in town. Of the distinctly European trees, the district should be able to carry the oak, the Spanish chestnut, the robinia, the hawthorn, the willow, and the poplar. The last-named tree, went on the lecturer, and especially the species known as the white poplar, was a tree for which there was an ever-growing demand in the Colony, and this tree, planted in shady spots, would be a source of wealth to the farmer.

FRUIT CULTURE.

The fruit trees came in for a large share of attention, and the lecturer said that the prospects of a large export trade mainly depended upon the value the grower put upon his article. Many of the fruits grown in Natal were produced in other countries, and sold at a cost on the Home market which the Natal grower said he could not pack for, far less pay the freight and other expenses; but he could assure them that strict attention to their trees in their earliest stages of growth, and careful pruning in after years, made all the difference to the yield. It should not be the ambition of growers to grow big trees, but to raise up short, bushy trees of just such a height as would enable them to pick the fruit without the aid of ladders planted against the trees. This method of collecting fruit could only be attained by the careful training of trees at their youngest stages, and the grower should not be in a hurry to make his trees bear before their time. It was interesting to note that something like 10½ millions' worth of fruit was imported into the United Kingdom per annum, and surely Natal should come in for a share of this large amount of trade, the more so that Natal fruit ripened some time before the Cape and other southern countries' products could get on to the market in their season.

A hearty vote of thanks brought the proceedings to a close.

The provincial council of Liege (Belgium) is endeavouring to stimulate the culture of vines by making a present of 200 vines to anyone undertaking to cultivate them.

Notes on the Drainage of Farm Lands.

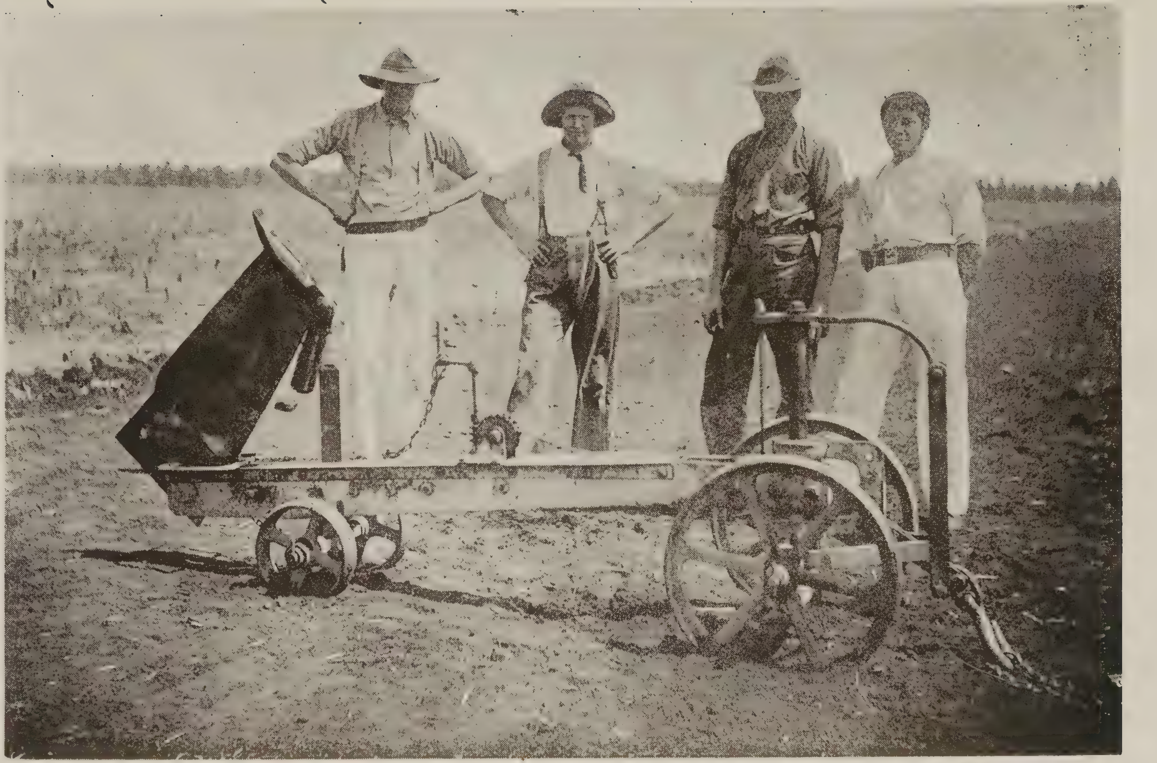
By E. R. Sawer, Director Experiment Stations.

The establishment of an export trade in maize and other agricultural produce finds a natural reflection in current advances in the value of arable farms and a very considerable extension of cultural operations. Such circumstances lend a new importance to the problem of reclaiming, even at considerable expense, our alluvial soils as represented by vleis and low-lying flats, the potential resources of which probably exceed those of total areas now under cultivation. The removal of surplus and stagnant water from such lands to fit them for tillage and the cultivation of crops is a subject already engrossing attention, and a consideration of ways and means for effecting such reclamation will not, it is believed, be out of place.

Necessity for the adequate or artificial drainage of arable soils is determined by the fact that the roots of farm crops, with the exception of such aquatic plants as rice, require air and warmth as well as moisture. If the interstices of the soil be filled with stagnant water, seed planted will fail to germinate, and, if earlier conditions have been more favourable to establishment, the plants will subsequently be both suffocated and poisoned. It can be shown that seed maize will not germinate at a lower temperature than 55 degs. F., and blanks can frequently be attributed to the fact that this minimum has not been reached in cold, water-logged soil. The yellowing of maize in low-lying areas is directly due to the accumulation of noxious substances about the roots as a result of lack of aeration, and is comparable to a process of poisoning.

The nutrition of the crop is further dependent upon the maintenance of what may be termed a healthy circulation of soil water, which is only possible when good drainage exists. In the latter case two distinct movements of soil-moisture may be detected, obeying two opposing forces. Heavy rains falling on to the surface obey the law of gravity and sink into the subsoil, carrying with them from the atmosphere and surface soil food substances necessary to the growth of the crop. From the subsoil the surplus water is again drawn towards the surface during times of drought by capillary action comparable to that seen in the wick of a lamp. Upon this water circulation is based every system of farm drainage and cultivation.

If the rainfall, or "water of saturation," remains in the surface soil for many hours, much damage is done: if for several days, the crop is



MOLE PLOUGH FOR OPENING SUB-SOIL DRAINS IN STIFF CLAYS.

ruined. Similarly, if the "water table," or level at which the subsoil moisture stands, approaches too near the surface, unfavourable conditions again prevail, and call for control by means of subsoil drains. During prolonged periods of drought, on the other hand, the water table may fall several feet and capillary action fail to bring it to the surface in sufficient quantity without artificial assistance from such measures as are adopted in several well-known systems of "dry-land farming." Yet a further condition may be detected in which capillary action is so effective as to lead to undue upward movement of soil moisture and consequent exhaustion by excessive evaporation from the surface, especially during drying winds. The last case is to be obviated by the provision of a dust or vegetable mulch which acts as a natural lid to the reservoir of soil moisture by breaking the continuity of the capillary passages.

Cold and heavy soils hinder this free circulation, and therefore frequently require draining. A cold soil is one overlying an impermeable subsoil. A heavy soil is one containing a large proportion of clay. A clay soil contains a large proportion of small, closely-packed particles which hinder the passage of water. Sandy and gravelly soils on the other hand show a number of large open pores through which rain water passes rapidly, as gravity acts almost unobstructedly, though the best conditions for capillary movement may not be present, and the soil consequently a dry one. All soils do not therefore call for artificial drainage, even though situated in a low-lying area. If there is no surplus surface moisture because the land is already under-drained by nature, as in the case of sandy loams with a gravelly subsoil, it is only wasted expenditure to attempt draining.

There are certain external signs of the need of draining which can hardly be mistaken. Water standing in the furrows some hours after the rain has ceased, and a crust forming on the surface after sunshine which opens in small cracks are sure indications. On poorly drained lands the soil will stick to the boots, or to the hoofs of horses, and puddles will collect in the footmarks thus made. Damp patches at points where the surface is at a slightly lower level point to the desirability of draining the whole area. Where it is found that the roots of crops and trees lie near the surface instead of making vigorous and deep growth, a cause may generally be found in the accumulation of water near the surface, which will be confirmed by the presence of an unhealthy yellow colour in the subaerial portions of the plants. In such a situation a stick pushed into the soil forms a hole in which water collects, and removes a lump of putty-like clay. The presence of typical marsh plants such as water grass reeds, sedges, etc., are, of course, *prima facie* evidence of the need of thorough artificial drainage prior to the cultivation of the land.

A preliminary step to the organisation of drainage operations is the preparation of a contour map, to be supplemented by a careful determination of the lie of surface waters after heavy rains. The presence of hillside springs at the outcrop of impervious strata renders a contour plan insufficient basis in itself for the construction of the final drainage map, which must be based upon all possible data. Such a map can only be safely compiled in a country where a dry season prevails at certain times of the year, after the occurrence of prolonged or heavy rains. Contouring, however, is an invaluable method of ascertaining the fall that can be given to, and the consequent capacity of, the proposed drains, and in view of the considerable outlay necessary to the completion of a satisfactory drainage scheme, careful preliminary survey is a matter of the first importance.

A first principle of modern draining is that "surplus moisture should be removed down through the soil and not off along its surface." Subsoil drainage has many advantages over a system of surface drains, among which mention may be made of the following:—It facilitates all cultural and harvesting operations. Open drains are better than none, but greatly impede the work of the farm. Subsoil drainage prevents loss of fertility as a result of surface washing. The latter removes not only fertilisers applied to the land, but also soluble salts and fine soil originally present. Surface wash or surface drainage cakes and puddles the upper soil. On the other hand where rainfall is drawn down through the soil, fertility is added by every shower, for the rain contains perceptible amounts of nitrogen and other substances of value, which are strained or filtered off by the soil particles and retained for the use of the crop. Subsoil drainage further warms the soil by removing surplus water, which would otherwise evaporate from the surface and chill the soil. It allows warm air to pass up from the subsoil in winter, and warm showers to soak down in spring. As already pointed out, undrained clay soils are for this reason "cold," and sandy loams "warm." Subsoil drainage also increases the extent of root-pasturage. Crops and trees do not send their roots below the level of frequent saturation. It increases the pulverisation of the subsoil, for a dry soil breaks up more quickly than a wet, and a saturated clay sets into a hard puddled mass if tramped by stock or worked by implements. Subsoil drainage finally assists crops to resist drought. A well-drained soil has an open sponge-like character, capable of absorbing and holding far larger quantities of water than an undrained clay, which when saturated becomes so compact that no interstices remain to be filled with water. During drought the latter soil will crack into clods which further the drying out process and are inimical to healthy root-development.

Open drains are only to be recommended for catchwater ditches at the foot of steep hill-slopes, for main drains to receive the outlets of lateral subsoil drains, and where the expense of closed drains is altogether prohibitive. The last-named consideration demands an enquiry into the relative costs of the different forms of subsoil drains available for the purpose in view. At the outset it may be stated that tile-draining, though offering many advantages, calls for a capital outlay which may well cause cultivators to hesitate. Where an interval of thirty feet is allowed between laterals, an economic minimum in many classes of soil, 1,452 feet of tiles will be required to completely drain an acre, costing, at 2½d. per foot, no less than £15 2s. 6d. Drained land should in such case be the pick of the whole farm, and the additional increase in the yield of crop, as the result of drainage, more than sufficient to pay interest at the rate of 10 per cent. on this expenditure.

It is, however, even principally our object to point out satisfactory alternatives whereby subsoil drainage can be provided at far smaller cost. Excavating and filling of trenches are items of hardly smaller importance than the price of such materials as tiles, and a means has been found of obviating the necessity both for trenching and tiling, applicable to lands showing a stiff subsoil. The Mole Plough, as shown in the accompanying illustrations, consists essentially of a sharp, pointed wedge or roller carried on a broad, sharp shank some three feet in length. The cut made by the shank closes after the plough, while that made by the roller and shaped by the following plug, becomes a water-channel in the subsoil capable of carrying off surplus moisture. With a span of eighteen oxen ten acres a day may thus be drained and the channels in stiff clay will last for years. The landed cost of this implement is £28.

(*To be continued.*)

The London correspondent of the *Transvaal Leader* states that, in connection with the importation of Natal maize and similar products into Britain, it is urged that a better system of packing should be introduced, as coal dust and other factors tend to spoil the high prices which the produce ought to command.

Standing in the farmyard at Aisby, near Ancaster, is a wheat stack over thirty years old. The owner has vowed that he will not thresh the stack until wheat makes £3 per quarter. According to the latest official figures to hand the average price of wheat in England is 33s. 3d. per quarter; so that it is likely to be some considerable time yet before this stack gets threshed.

Natal Wattle Bark.

AMERICAN MARKET PROSPECTS.

POSSIBILITIES OF BARK EXTRACT.

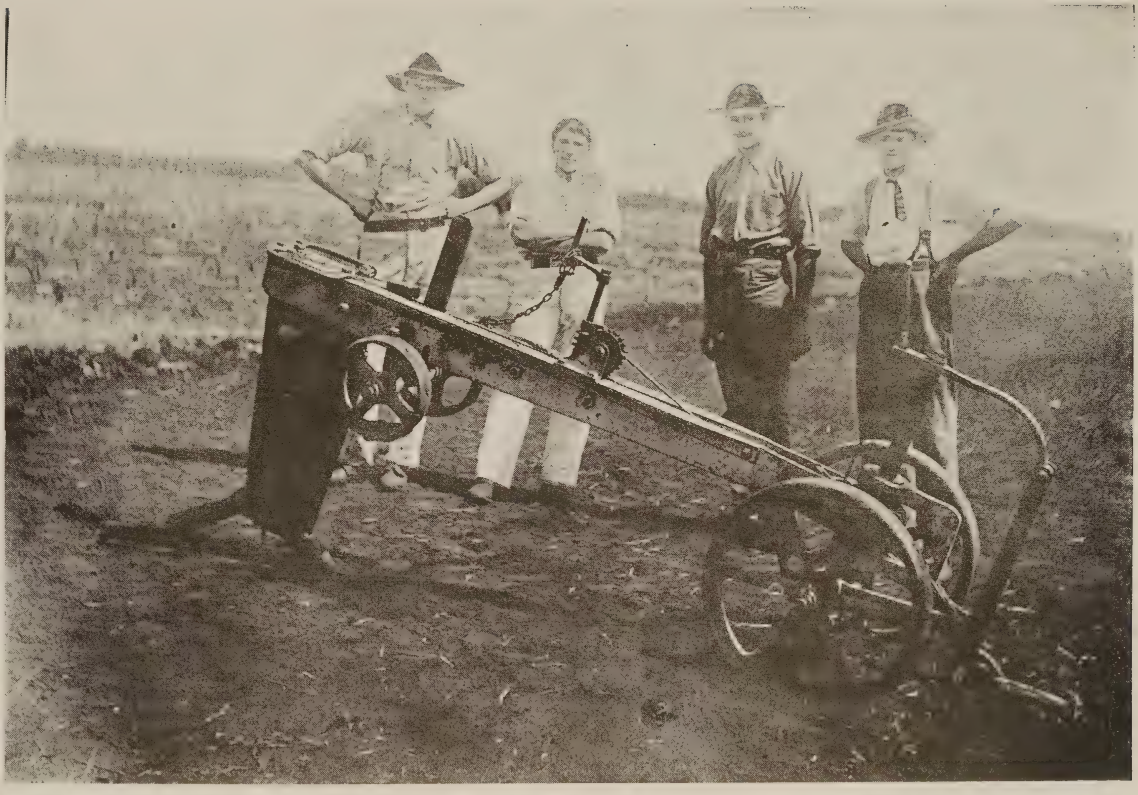
In our September issue we published an article based upon information collected by the Agent-General, at the request of the Prime Minister, relative to the present conditions and future prospects of the European and other markets for wattle bark. Other communications have since been received from the Agent-General, enclosing further correspondence, dealing with the American market, and also with the prospects of bark extract.

Enquiries were made on behalf of the Agent-General through the Commercial Intelligence Branch of the London Board of Trade by the British Acting Consul-General at New York. From the letters forwarded there does not seem to be very much prospect of wattle bark being imported by the United States under present conditions to any considerable extent. One firm written to stated, in fact, that they have had on their hands for three years a consignment of fifteen tons of wattle bark which they have been absolutely unable to dispose of.

According to an United States Forest Service Circular, the consumption in 1905 (based upon reports received from 477 tanneries) was some 800,000 cords of hemlock bark and some 304,000 cords of oak bark, the total value of the same amounting to 8,232,457 dollars (£1,715,095). The consumption is less than that of 1900 by 512,020 cords; but against this the consumption of extracts has increased from 67,000 barrels of 500 lbs. each to 292,400 barrels, of which 52,400 were hemlock, 187,600 oak, 51,200 chestnut, and 1,100 palmetto.

In the large tanneries on the Pacific Coast the principal tannin agent has been the tan oak bark, which is chiefly obtained from California, mixed with a small amount of imported material or extract. The leather produced is an exceedingly high grade of heavy leather, such as is used for belting, soling skirting, etc., and for this kind of leather it is claimed that nothing equals tan oak.

Quebracho wood from the Argentine is also largely used on the Pacific Coast in the form of a dry extract. This dry extract is not as popular as the liquid extract, but transportation charges compel, at present, the use of the former in California. Quebracho, which has only in recent years been employed in any quantity in California, is invariably mixed with tan oak bark and not used by itself, the proportion generally



MOLE PLOUGH: METHOD OF INSERTION.

being a quarter quebracho and the remainder tan oak. The tanner demands that his tannin agent should not only contain a high percentage of tannin but also certain other acids such as gallic or acetic. Quebracho wood contains from 40 to 50 per cent. of tannin, while the Venezuelan mangrove contains about 23 per cent. and the African 35 per cent. The Venezuelan sells at from 15 to 16 dollars and the African at 40 dollars per ton.

The tendency of the American tanners to-day is towards the use of extracts instead of bark. There is practically no waste or residue in the use of extracts; and as extracts are more convenient to use and their action is quicker, the American as well as the European tanners are, it is stated, much more kindly disposed towards the use of extracts than towards bark. The consumption in America of quebracho extract has, for example, during several years past grown very largely and has to a great extent taken the place of bark and other materials.

One correspondent states that he has been consulted by several growers in Natal, and that there has been a suggestion to make extract in this country. This he considers would be an excellent plan, for, he says, "a good extract would find a market not only in this country (*i.e.*, England), but in the United States, where there is a vast market." He points out, as other correspondents have done, that Natal bark has up till now not been largely dealt with in America, but adds that there is no doubt whatever that this material could be used over there. The only large importing firm which is handling it at all in the United States, it is stated, is Messrs. A. Klipstein & Co., of 122, Pearl Street, New York.

The same correspondent remarks that it is difficult to say exactly what the future of Natal wattle bark in England will be. A certain amount of our bark, he says, is always being used, although its use has gone down of late owing to the considerably cheaper tanning materials which have been offering on the market. There has been an over-production of chestnut extract, which has brought down its price in some cases to below cost. This has been used instead of barks and other fibres. It is considered, however, that when the market rights itself Natal bark will come back into favour, and the writer sees "no reason why the old price of about £10 a ton might not be obtained if of good quality and properly harvested."

The chief factor which places our wattle bark at a disadvantage in competition with other tanning materials in the United States is the high prices which up to the present time have been quoted. Although the sea freights are low, nearly all the tanneries in the United States are located inland, and the combination of ocean and inland rail freights on an article of which probably not more than one-third of the weight could be utilised in the manufacture of leather (the residue after the tannin has been exhausted being only adapted for very poor fuel), added to the prime cost would prove, it is said, too expensive for the use of American tanners. One firm remarks that, "although it is possible that in ten or a dozen years from the present time the conditions may so change that the American tanners would be likely to consider the use of this bark, there is certainly nothing in the present situation to warrant their doing so."

The Stamford Manufacturing Co., importers of chemicals and dyestuffs, 88, Wall Street, New York, would, however, be glad to hear from any one who has bark to sell and wishes to try and open up a business in the United States.

Mining in Madagascar.

PROVISIONS OF THE NEW LAW.

A COPY of the Madagascar Mining Law of the 23rd May, 1907, has been received. This Law regulates the prospecting and working of natural deposits of gold and of precious metals such as silver and platinum, also of stones, whether alluvial, conglomerate, strata or reef. All strata or reefs of quartz or other rock containing gold or other precious metals, or precious stones, are considered as "reef" deposits. All other deposits are considered as "alluvial." The prospecting and working of other minerals are subject to the provisions of a special Decree.

Before prospecting, a permit must be obtained from the Chief of the Mines Department. Such permit will confer on the holder the exclusive right to dig or bore to any depth within the limits of a circle having a radius of 1¼ miles. Before application for a prospecting permit is made, the area for which the permit is required must be indicated by placing a peg in the ground, in the centre of the circle, having on it the class of mineral being prospected, the name of the individual or company for whom the permit is desired, and the date of insertion of the peg. Requests for permits should be made to the Chief of the district (*Circonscription Administrative*) within which the ground has been pegged. Each request must be accompanied by such detailed plans and particulars as shall enable the peg to be located and its geographical position accurately determined. On ascertaining that the request is in order the Chief of the Mines Department requires from the applicant the sum of 100 francs (£4), being the charge for a prospecting permit for the first year.

Prospecting permits are available for one year from their date of issue. This limit may be extended to a second or third year on further payments of 200 francs (£8) and 500 francs (£20) respectively, The holder of a prospecting permit can obtain authorisation to dispose of the produce of his working on payment of an *ad valorem* duty of seven per cent.

The right to definitely work (*exploiter*) a claim can only be acquired by virtue of a working permit (*permis d'exploitation*). The holder of a prospecting permit may, at any time during the period in which it is valid, exchange it for a working permit. The area to be worked may not exceed 1,000 hectares (2,470 acres) nor be less than 200 hectares (494 acres), in the form of a rectangle the smaller of whose sides measures not less than a quarter of the greater, the sides running north-south and east-west respectively. At least two-thirds of this rectangle must be within the limits of the prospecting area. The limits of the working area must be properly pegged off at intervals not exceeding one kilometer. A separate working permit is required to be taken out for each working area.

In making application for a working area—which should be to the Mining Commissioner for the district in which the required claim is situated—a detailed plan must be supplied of the area applied for, on a scale of 1 : 10,000, indicating the true north and also the exact position of the pegs. The nature of the minerals contained in the claim must be stated. The permit will not be granted if, through the fault of the parties concerned, the application be received after the expiry of the prospecting permit, or if the required conditions have not been fulfilled.

It is required that each permit holder should keep a register of production and of sale or despatch of the proceeds of his claim for each working and prospecting area, which shall be open at all times to the inspection of agents of the Mines Department. Each permit holder is further required to immediately notify to the Commissioner of Mines the existence of any reefs which may be discovered within the limits of his area.

Every working claim is subject to a fixed tax of seven per cent. of the value of the produce extracted. At the end of every three months, reckoning from the date of the delivery of the working permit (and with a delay not exceeding one month), the permit-holder must report to the local Mining Commissioner the output of each claim during the previous three months. It is on this basis that the Mining Commissioner computes the sum due for the previous quarter.

A person trading in gold, precious metals or precious stones, in their natural state, extracted from the ground in the Colony, is required to take out a licence for such trading, paying the tax for special class (*hors classe*). Holders of mining permits who sell the produce of their claims, and who have the permit to do so above referred to, are not, however, considered as trading in gold, precious metals or precious stones, and do not pay a trading licence. Provision is made in a new Law for prospecting and working permits issued under previous decrees.

Trout in Natal.

ESTIMATED ANNUAL INCREASE.

By J. C. Parker.

It is maintained by those interested in the European salmon fisheries that not more than three out of every thousand salmon eggs produce fish that reach the breeding stage, owing to the heavy toll levied on the fry in the estuaries and the sea by birds, mainly sea gulls, seals, porpoises, and rapacious fish. As the common trout does not go to sea and has not to face such perils, I have taken as one of the factors of the calculation that ten out of every thousand trout may survive to breed—that is, one out of every hundred.

A trout will breed when three years old, when we may suppose it will weigh 1 ℔., increasing ½ ℔. each year. For every pound weight 1,000 eggs are produced.

I have taken as an example the Mooi River, stocked in 1899 with 400 fry. We will suppose that half these died before they were three years old and that half of them were females. They begin breeding in 1902. The probable increase of trout in Mooi River will thus be:—

1902: 100 breeders of 1 ℔. each give 100,000 eggs,
or 1,000 reaching maturity.

1903: 100 breeders of 1½ ℔. each give 150,000 eggs,
or 1,500 reaching maturity.

1904: 100 breeders of 2 ℔s. each give 200,000 eggs.
or 2,000 reaching maturity.

1905: 100 breeders of 2 ℔s. each, plus 500 of 1 ℔. bred 1902, give 700,000 eggs,
or 7,000 reaching maturity.

1906: 500 breeders of 1½ ℔. each, plus 750 of 1 ℔. bred 1903, give 1,500,000 eggs,
or 15,000 reaching maturity.

1907: 500 breeders of 2℔s. each, plus 750 of 1½ ℔., plus 1,000 of 1 ℔, give 3,125,000 eggs,
or 31,250 reaching maturity.

If the local fishermen catch three thousand every year—which is far more than is likely,—they practically make no impression on the ever increasing stock of trout. Nature must have some secret way of her own to check this increase,

Ostrich-Farming as a Paying Industry.

SEVERAL inquiries having been made lately of the Department of Agriculture relative to ostrich farming, it will not be inopportune at this stage to draw attention to the valuable chapter on Ostriches and Ostrich Farming in Prof. Wallace's work on "The Farming Industries of Cape Colony," published in 1896 by Messrs. P. S. King & Son. We believe copies of this work are now somewhat difficult to obtain; and a summary of the chapter in question will probably be found useful by readers interested in the subject of ostrich farming.

Ostrich farming in Natal is only on a very small scale at present—and has been so for a number of years—but there seems no reason why more farmers should not go in for it, as there appear to be many parts of Natal suitable for this branch of farming—*e.g.,* the Thorns and edge of the Thorn Country of the Colony. In the opinion of Mr. D. C. Slatter, who was interviewed in 1900 for this *Journal* by "Ergates," there is perhaps nothing in farming that pays better—and in this connection it must be borne in mind that the ostrich farmer does not rely on the local market. "Ostrich farming in the 'Thorn' country of Natal," Mr. Slatter said, "is a solid and

MOST PROFITABLE INDUSTRY:

there is no mistake about that. And it is a comfortable, easy-going occupation—just the thing for a man not wishing to be extravagant in the expenditure of energy. But the man must know how to do what is wanted, and his supervision should be constant."

Prof. Wallace says that ostriches do not thrive well under conditions of extreme cold or of heavy rainfall, and even on land suitable to them they soon do badly if overcrowded. On grass of strong growth, particularly that close to the coast-line on the sour veld where it becomes hard and indigestible, ostriches are not so successful as when fed on sweet Karroo bushes, although there are few parts in the Cape Colony where they cannot be kept. One advantage which a dusty bush country possesses over a grass country lies in the feathers being preserved in better condition where the birds can take a dust bath than where they will roll about in early morning on the dewy grass.

They are fond of all sorts of bushes which sheep eat; and when the country is devastated by swarms of locusts, ostriches, like most animals, consume locusts, but they are not, as a rule, insect-feeders. They do not suffer from the attacks of ticks so much as four-footed animals, for they remove them from all parts of the body which they can reach with their bills, leaving only the head, upper neck, and under the thigh assailable.

There is stated to be no contagious disease from which ostriches suffer, although they are most susceptible, especially when young, to the attacks of internal parasites. These they pick up with their food from the veld, or take in with impure drinking water.

Young chicks feed at first on the solid excrement of the old birds; and they thrive particularly well when they have access to the residential quarters of the Kafir population. To supply a sufficient amount of bone-earth to satisfy the demands made on the system for material to form the skeleton, it is necessary in many parts of the country where phosphate of lime is deficient in the soil, to provide broken bones for the consumption of the birds, and on sour veld salt should also be given.

Ostriches do well when permitted to run over arable fields while out of cultivation, as they are fond of the numerous succulent weeds that are found in such places. Like pigs, they are particularly fond of arum lilies. Ostriches at any age will eat pumpkin pips, which, when taken in quantity, paralyze the limbs for a time.

During prolonged periods of drought, when the natural food becomes exhausted, it is necessary to supply the whole stock with some form of

SUCCULENT FOOD

to prevent their dying of starvation, or suffering from stop-sickness or constipation. The power of digestion of an ostrich is proverbial, even to the digestion of horse nails and pieces of wood, but this vigour need not be looked for unless the bird be in good health and living on suitable food. The succulent branches of the prickly pear or the leaves of the American aloe (agave), chopped into small pieces, serve the purpose admirably, and birds can be successfully carried through a period of scarcity on this food, supplemented by an allowance of 1 lb. of mealies daily.

In those districts where lucerne is extensively grown under irrigation, the ostrich farmer is independent of difficulties arising from climatic irregularities. Two hens and a cock can be kept during summer in a lucerne crop of less than half an acre, and are not able to consume the whole produce. Ostriches thrive admirably on green lucerne during the growing season, and in winter time on lucerne hay cut into short lengths, and well wetted the day before it is to be consumed. A daily allowance of 3½ lbs. of hay, when birds are running on bare veld, will keep them in good condition. Oat hay treated similarly is found to be constipating, but this defect would be easily remedied by showering the hay-chaff with treacle water from a rose can—a dressing which would also make the hay more palatable. Birds fed during a period of drought are liable to injure their feathers by rushing against each other. Chick ostriches at all times, and old birds when on dry food, require to be supplied with water; but the latter do not absolutely need to drink if they be feeding on green herbage. There ought to be no muddy dams in an ostrich camp, as the birds get into them in hot weather to roll, and thus destroy their feathers.

Ostriches require to be

ENCLOSED IN CAMPS.

Wire fences form by far the most available means to this desirable end, although, owing to their invisible nature, they are a serious source of danger to birds, until the latter become accustomed to them. A single wire fence of four or five wires (galvanised, in preference to annealed, so that they may be the more readily seen), five feet high, serves the purpose well, when birds are in camps on the veld, as the cocks soon find out which one is master, and the weaker ones keep out of his reach; but where birds are kept on lucerne on areas of less than an acre, it is necessary to place two fences a few feet apart from each other to divide the camps, so that the birds cannot get at each other.

On good Karroo-bush veld one bird should not be allowed less than 15 acres. Camps of 30 acres, or even 40 acres, for the accommodation of a pair of breeding birds, do very well, and it is most advantageous both to the veld and to the ostriches if some other description of stock be pastured on alternate years. The bushes which ostriches eat closely then get a chance of growing, and cattle, sheep, and goats keep down other bushes that tend to grow too rank. Moreover, some of the parasites which attack ostriches disappear or become reduced in numbers during the period that the birds are on other veld. Cattle do well when pastured throughout the season on the same veld with ostriches, but under similar circumstances sheep and goats thrive badly.

Although it is a common practice to put two hens with one cock, it is best to have a pair of birds together, if the cock be quiet. If he teases the hen mercilessly it is necessary to give him two, or even three, hens, to divide his attention and prevent him actually killing the one.

The hen ostrich lays from 12 to 17 eggs. When two or three dummy eggs are left in the nest, and the real eggs are regularly removed, a hen will lay as many as 30 before stopping. The period of incubation is six weeks, and the hen sits during the day, while the cock remains on guard in the vicinity, and takes her place at night. Some birds remain off the eggs only for a few minutes, while others will leave them to cool for an hour or more. At times the cock drives back the hen somewhat roughly to her domestic duties when it appears to him that she has been too long away. The eggs may become quite cold to the touch and not suffer in consequence; and when birds are not molested they usually bring out a chick for each egg, chipping the hard shells with their beaks at the proper time, to liberate those that have difficulty in escaping.

In well-managed camps, a proper place is prepared for

THE NEST,

after three or four eggs have been laid, by digging a hole 6 feet wide by 2 feet deep beside the original nest, and filling it with gravel, to secure drainage in the event of heavy rains occurring while the birds are sitting. After the birds become familiar with the alterations, the eggs are moved on to the place prepared for them. Birds that are well fed and attended to may have as many as three nests in one year; and two nests are quite common.

After the hen commences to lay, the cock bird becomes unsafe to approach, unless one be armed with a long thorny mimosa branch which, on being held out in the line of his eyes, will stop the charge of the most savage birds. The hen, which throughout the early period of hatching remained quite harmless and safe to approach, becomes even more savage than the cock as soon as she hears the chicks chirp in the shell.

STAGES OF GROWTH.

Ostriches are spoken of as *chicks* as long as they retain their first feathers, *i.e.*, up to seven or eight months old. After this, until they are twelve months old, they are designated *young birds.* They are *plucking* or *feather birds* from one until they are four years old, and then they become *four* or *five-year-old birds.* At four years old they come to maturity, and are camped off for breeding.

The distinguishing characteristics of the different ages, which, however, do not follow an absolute rule in all birds, are quoted by Prof. Wallace from Douglass as follows:—

At *six and a half months old* the quill feathers will be ready to cut; some of the body feathers will have begun to change; some of the cocks will show yellow in the front of the legs.

At *a year old* the second growth of quill feathers should be showing; some of the cocks should begin to show black feathers; all cocks should show white on legs and bill.

At *two years old* all the chicken feathers should have gone from the back, and the cocks should show quite black, or nearly so. Most of the little white belly feathers should have been replaced by blacks or drabs, according to sex. (Exclusive of the white plumes, black is the mature colour of the male, and drab or dark grey that of the female and young male.)

At *three years old* there should not be a single chicken feather to be found on the body; the last place from which they disappear is where the neck joins the body. Every vestige of the white belly feathers has gone. The bird's plumage has reached perfection; some of the cocks will be red in front of the leg and on the bill.

At *four years old* the birds have reached maturity and the breeding organs are fully developed; the cocks in season will have the back sinews of the leg pink, the front of the leg and the bill scarlet, and much of the fineness of the feet, the leg, and the lines of the body will have gone.

At *five years old* and upwards the only distinguishing marks we know are a generally coarser look of the limbs and body, and an increased coarseness of the scaling in front of the legs and feet.

Plucking the Feathers

of birds that run on natural veld is done for the first time when the bird is about seven months old, by clipping the quills when these have become dry, so that no blood will come, and at the same time the tail feathers and drabs, two rows of body feathers from the upper side of the wing, and two rows below it, are pulled. Two months later the stumps, then quite ripe for removal, are drawn by means of small forceps. Six months after the first drawing of stumps the second plucking takes place, followed by stump-extracting at the end of eight months, and so on, a crop of feathers being secured every eight months, or three crops in two years. The

Relative Values of the Pluckings

are as follows, although the actual figures fluctuate with the prices in the market. If the first crop be worth 4s to 6s, the second will fetch 15s to 20s, the third £1 5s to £2, and the fourth, which is the most valuable of all, £3 10s to £4. When birds are fed on rich food, as on lucerne, a crop of feathers may be got in seven months.

Cutting of both the tail and quill feathers is done at six months, and the stumps and short feathers are removed a month later. The high feeding tends to make the quills stronger, and as regards the finest plumes not worth so much per pound, but the quantity of produce is greater, and the total value per bird more. At Oudtshoorn 2 ℔s. of blacks and drabs may be got from one plucking, while in the Eastern Province, where the system of management is not so intensive, the weight might probably not exceed 1¼ ℔s. from a bird.

Much can be done by way of improving the quality of a breeding stock of birds by careful selection of those of best form which produce the finest quality of feathers, and by discarding those that are inferior in those respects. At one time there was a run upon light-coloured hens, which possessed more white feathers than dark hens, without sufficient care being bestowed in selecting for quality of feather. It is now known that dark hens of good feather exercise a beneficial influence upon their male progeny, and quality has consequently taken precedence of lightness of colour. The cock must be depended upon to produce the best white plumes, as the gloss of the female feathers is not so good. It is also important to select birds descended from parents which have been successful breeders. Douglass says, in writing of the

Points to take into Consideration:

"They should have a well-developed, muscular frame, large feet, thick, powerful-looking legs, with great depth of girth, and a prominent bold eye. On no account have anything to do with a herring-gutted, fly-away looking bird. A bird, if in good condition, should be broad across the back, with a furrow running down the middle. The tamer and more domesticated they are the better, but by tameness is not meant want of pugnacity. The body feathers should be curly, rich in colour, with a shiny gloss on them. The great complaint against Cape feathers is a want of fulness, closeness, and breadth of fluff of the lower part, as well as a want of width at the crown."

The

PRICES OF OSTRICH FEATHERS,

being dependent upon the whims of fashion, which is liable to change, must remain somewhat uncertain. This fact should lead a farmer to provide more than one string to his bow, and adopt ostrich farming as one branch of his industry, not as the sole means of livelihood.

Apart from this being a judicious and safe course to follow by a person desirous of eliminating from the business of his every-day life all excessive market fluctuations, which lead to the introduction of something not far removed from gambling, we have already seen that decided advantages result from the annual change of stock on the natural veld, and we may therefore conclude that the profit per bird will be greatest when ostriches do not exceed a certain, and not an excessive, proportion of the stock upon the farm.

Budding the Avocado.

THERE is a fair demand in this country for the avocado pear among those who have acquired the necessary taste for the fruit, and some attention could profitably be given to its cultivation by fruit-growers. Until the last five or six years it was thought that the avocado came true to seed, and attempts to propagate good varieties asexually were wanting or had failed. According to Mr. P. J. Wester, writing in the *Florida Agriculturist,* great credit is due to Prof. P. H. Rolfs, of Lake City, and Mr. George B. Cellon, Miami, Florida, who did the pioneer work in budding the avocado. As, in the early days of the orange industry, the budding of citrus fruits was thought to be very difficult, so the budding of the avocado was at first considered a complicated operation, but the difficulties are being rapidly cleared away as experience is accumulated, and as much as 75 per cent. of buds have been got to develop into trees, The method of budding is the same as that employed in the budding of citrus fruits. There have been complaints that the buds do not take or that they do not start readily. This is stated to be due not to an inherent difficulty in the avocado to be budded, but rather to the inexperience of the performer, either in budding, or, more frequently, in the selection of bud-wood. Only large, well-developed buds should be inserted, and rather larger than citrus buds—certainly not less than three-fourths of an inch in length, and, preferably, one inch, as small buds are frequently grown over where the stock is in vigorous condition, as it should be. It has been found by experiment that tender wood is preferable to older wood, and even the soft and tender tops, inserted as sprig buds, have been used with perfect success. Where old and hardened wood is employed, the buds frequently drop, making a "blind bud." For wrapping the buds, waxcloth is preferable to string, as it affords the bud better protection from injury and water. The buds should be inserted in spring and early summer. Two weeks from the date of budding the buds have taken and the trees ready to lop. The trees should now be gone over every two weeks, the wild sprouts rubbed off, and, when the buds have made a growth of eight to twelve inches, the stock may be trimmed back to the bud.

The best material for grafting or budding tape is cheap cotton cloth which will tear easily. Rip up the cloth in strips of desired widths, say six or seven inches, and roll these tightly on stout iron wire as long as the width of the cotton strips. Several strips may be rolled on until the roll is one inch in diameter; tie a string around the roll at each end to prevent unrolling while being boiled in the wax. A good wax is made by boiling together two pounds of beeswax, two pounds of rosin, and one-half pound of good lard; when in boiling state put in the rolls of cloth and let them remain for fifteen minutes, when they are taken out and cooled off before being stored away. The iron wire is more desirable than sticks of wood, as the weight of the wire keeps the roll below the surface of the boiling mass. Another advantage in using the wire is that, if the wooden sticks are not quite dry, the water as it is converted into steam will cause the contents to boil over.

Anyone in possession of large, unproductive avocadoes can easily convert them into paying trees by cutting them down about three or four feet above ground and budding the sprouts, which soon make a start. For home use, any fruit of good quality will answer the purpose. In budding for a commercial orchard, it should be kept in mind that the very early and late varieties command the highest prices. Other desirable points are: prolificness; skin smooth, thick and leathery; good keeping qualities; the seeds filling the cavity, as a loose seed pounds the walls in transit, causing early decay; small seed.

The Home Preservation of Fruit.

SOME USEFUL HINTS.

THE proper preservation of fruit and vegetables for winter use is an important question for the farmer's wife, since she has, or should have, an abundance of fresh fruit and vegetables which, if properly preserved, would go far to reduce both the grocer's and the doctor's bills. The large canning establishments will, of course, always supply the demands of the population of the towns, but every farmer's wife can provide her own supply at a lower cost and at the same time know the true composition and purity of the goods.

In addition to supplying the wants of her immediate household circle, the demand in the towns for "home-made" jellies, fruit juices, and preserved fruits, especially for the sick, is always great; so that, by preparing a few jars over and above the requirements of her household, a source of income for the farmer's wife is provided. With the establishment and development of the Home Industries Society, a considerably larger field than hitherto existed is provided ; and it may accordingly not be out of place here to refer to studies undertaken at the Wisconsin Experiment Station, U.S.A., in the direction of the preservation of fruit in the form of jams, jellies, etc. Mrs. L. H. Adams and Mr. E. P. Sandstein have embodied the results of their investigations in an interesting bulletin recently issued by the Station, giving a number of useful recipes. Dealing with the question of the condition of the fruit, they draw attention to the importance of fruit intended for canning being in the right stage of ripeness. This stage is difficult to describe, though in general it should be firm, having attained its full size and normal colour. It should be free from all kinds of blemishes, such as scab, rust, rot, and all forms of insect life. Fruit intended for canning in any way should be utilised as soon as possible after it is picked. If left standing for hours, even if the fruit is not over ripe, the fine flavour is lost and the keeping qualities are greatly impaired. When fruit is put up by the oven method, the authors' recommendation is that either the oven be covered with heavy asbestos paper and the jars likewise, or that the jars be placed in a dripping pan with a little cold water in the pan, placing a pan over the jars, as the fruit cooks faster in the top and may turn a little dark if not covered.

In making preserves, different fruits require different amounts of sugar; if a heavy syrup is wanted and no syrup gauge is at hand, use just enough water to liquify the sugar and heat very slowly, as sugar often crystallizes in the bottom of the jar if boiled rapidly, and the fruit will not be sweet enough. In making syrup, when it begins to boil run a wet cloth carefully around the edge of the pan to take out the impurities in the sugar, leaving the syrup clear.

In considering the recipes contained in the bulletin, we may commence with the directions given for making jelly—which is described as "the most interesting and the most uncertain of any of the ways of caring for fruit." Fruit for jelly is best gathered a little unripe; and if gathered after a heavy rain a greater amount of boiling will be required. Great care should be used in skimming jelly: the juice should not be stirred, but the scum skimmed off carefully. If allowed to boil over the jelly will not clear.

Before the jelly is put into the glasses, the latter should be sterilised, and they should be drained thoroughly as otherwise air bubbles are apt to appear in the jelly. When filling the glasses, fill each glass full before attempting to fill the next, as jelly will slide off in layers when turned out if put in a little at a time. Boil only a small amount of juice at one time, and use a shallow pan, as the water then evaporates faster allowing the juice to become converted into jelly in less time. Some people think that fruit that is not fit to can or preserve is all right for jelly, but this, we are told, is not so. Perfect fruit is more essential for jelly than any other way of treating fruit. Soft ripe fruit may be used for jams or marmalades.

It is stated that fruits such as strawberries, raspberries, peaches, which are not easily made into jelly, make beautiful jelly if one-third rhubarb juice is used, and the flavour is not harmed by such addition.

A new way to make plum and other jellies is described. This is to put fruit dry in jars (two-quart jars are good for this purpose), and place them either in the oven in asbestos paper or in a fruit steamer and cook until the fruit is tender. Then take out and strain through a flannel bag. Add as much sugar as juice and stir until the sugar is dissolved. Place on the back of the stove and heat slowly until it forms jelly drops on the spoon. During boiling skim carefully. It will take but a little boiling as this is pure juice. This process, it is remarked, produces the clearest and finest plum jelly.

Directions are then given for making various jellies and other fruit preserves, the most useful of which may be given here.

APPLE JELLY.

In making apple jelly, cut the apples into quarters. They should not be cored or peeled. Cover with water and cook till tender and then strain. Let stand an hour or more and strain through a flannel bag. Measure out the same amount of sugar as juice, and boil the juice fifteen minutes before putting in the sugar. Stir until the sugar is dissolved and boil slowly till it jellies in a spoon. Plum juice may be added if a plum flavour is desired. Apple jelly often lacks a decided flavour and this can be enhanced by adding a small quantity of plum juice.

PLUM PRESERVES.

Plums are always nicer peeled, and it is easily done by placing the fruit in boiling water for a minute or two, then pouring on cold water. The skins will then slip off easily. If plums are canned with the skin on, either prick each plum with a needle or cut one side to the stone, so that they may remain whole.

CANNED PLUMS.

The most common way of canning plums to be used as sauce is to make a syrup by using pound for pound of fruit and sugar, or less sugar if not so rich a sauce is wanted. When the syrup is boiling add the fruit. Cook till tender, and carefully remove the fruit and place in jars. Fill up with syrup and seal.

PLUM MARMALADE.

Boil the fruit till tender and run through a sieve, add same amount of sugar as pulp and cook slowly till it thickens. This may be sealed in this state, or may be spiced and used with meats. One-half plum pulp and one-half crab apple pulp makes a better combination than all plum; or apples may be used instead of crab apples, but they do not give the firmness that the crab apple does.

STRAWBERRY PRESERVE.

It is very important that the berries be fresh and firm. For this reason they should be picked just before they are to be utilised. Carefully remove the stem, taking care not to bruise the fruit. If dirty, the berries should be washed before stemming. For preserves use as much granulated sugar as fruit. If for sauce, one-half to three-quarters the amount of sugar will be sufficient. Place a layer of sugar and then a layer of fruit. Let stand a half day or over night and can early in the morning. Take the juice and bring to boiling point, skimming carefully. Add the fruit and let all heat through and can hot. No water is used. By this method the berries will keep their colour and the preserves be richer.

It is stated that Chinese wood oil has come into great prominence in recent years as a varnish and paint oil, and has created a considerable amount of interest in America, Europe, and other parts of the world. The tree from whose fruit it is expressed is a native of the Yangtsze and West River Valleys. The value (c.i.f.) in Europe and America has been placed at £35 per ton.

Native Hemp.

Mr. J. Medley Wood, the Director of the Natal Botanic Gardens, Durban, sends us a copy of a letter which he addressed many years ago to a local paper on the subject of our native hemp. In view of the attention which is now being given to fibre cultivation, Mr. Wood's communication will doubtless find many interested readers.

In forwarding the letter Mr. Medley Wood writes:—"After a lapse of almost exactly twenty years the matter of exploiting the native 'hemp' plant is again coming to the front; and as I have already had several enquiries about it, and as some persons are wishful to give the plant a trial, I send you a copy of a letter which I wrote to one of the local papers in October, 1887, thinking that though somewhat antiquated it may still be found of use. I see nothing in it that requires serious alteration. The only addition that it occurs to me to make is to warn intending planters against using imported seed, the plants from which may, or may not, yield fibre of the same excellent quality as that obtained from our native variety."

The following is the letter referred to:—

Enquiries having been made lately about this plant, the following information may perhaps be useful:—

A number of specimens of fibre were sent from Natal to the Colonial and Indian Exhibition, and amongst them was one labelled "Hibiscus." This sample was examined by experts at Home, and was said to be one of the best, if not the best, fibre in the Exhibition; but they questioned the fact of its being obtained from an Hibiscus. A small sample of it was returned to me, to try to ascertain from what plant it had been manufactured, and, after some enquiry, it appeared certain that the labels had unfortunately been misplaced, and that the fibre in question had been sent by Dr. Sutherland and called by him "Native Hemp," the plant from which it had been prepared being the one known by the natives as *Insangu,* used by them for smoking. This plant is a species of *Cannabis,* but whether a different species to the one cultivated and yielding the ordinary "hemp" of commerce, or not, seems as yet somewhat uncertain. Specimens of the dried plant sent by me to Kew have been examined there and found not to differ botanically from the common *Cannabis sativa,* but it is worth notice that we find here that the seeds differ both in colour and size from those of common hemp, and the natives who so eagerly collect the indigenous plant for smoking will not use, or do not like, the imported plant, which they say is very much stronger than the one they have been accustomed to use. Some three years ago Messrs. McCubbin, of Durban, imported seed of "Chilian" hemp, the true *Cannabis* *sativa,* which was distributed amongst various farmers and others. Some was planted and came to maturity in the Gardens, but the plants did not attain the size they should have done, and most of them flowered at from one to two feet high—and this, I believe, was the experience of others to whom the seed was sent—while the native kind grows vigorously and attains a height of six or more feet, according to the soil and situation in which it is found. I therefore strongly advise those interested in this matter to collect the seed as largely as possible during the present season, or to obtain small supplies at once and plant so as to save seed for next season's sowing. It must be understood that in sowing plants for the crop of seed, they may stand widely apart, but if it is intended to utilise the fibre they should stand thickly on the ground so as to produce long unbranched stems, which alone are valuable for fibre.

I have also been asked as to what process is necessary for preparing the fibre for market and what machinery is required for the purpose. I am sorry I have no information as to any recent improvements or improved machines, if there be such, for the purpose. The old fashioned way which may be and probably is still in use, is by what is called "retting" the stalks, and there are three ways of doing so, called respectively "water retting," "dew retting," and "mixed retting."

"Water retting" is steeping the stems in either running or stagnant water, when fermentation ensues, which must be stopped by taking them out and drying them before putrefaction commences, the time required being five to ten days. In Europe, sometimes a much longer period than this is necessary, as much depends on the temperature of the water.

"Dew retting" is accomplished by spreading the stems out upon the grass and turning them over from time to time, until the fibre is ready to separate from the wood.

"Mixed retting," which may be found the most preferable plan for Natal planters, consists in steeping the stems, either when freshly cut or after a day or two's exposure upon the grass, in water, until the acetous fermentation is complete, and then spreading them thinly upon the grass as in "dew retting," turning them occasionally until the process is complete.

In whichever way the stems may have been treated, all that is necessary afterwards is to free them from the woody portion of the stem, which is done by a small hand machine called a "brake" and consists of a grooved block to which is attached by a pivot a wooden "sword," also grooved on its lower surface. Between these two the stalks are passed, while the "sword" is worked up and down by hand; this breaks up the woody portion of the stem, so that it may be readily separated from the fibrous portion, which is then ready for packing. There are no doubt other and comparatively inexpensive machines which accomplish the same object more rapidly, but I have no recent information about them.

As to the yield per acre, I find on reference to the Official Handbook of the C. and I. Exhibition that the crop of green stems is said to be about sixteen tons per acre, of which twelve are lost in drying. "The residue consists of soluble matter, woody and other refuse products three and a half tons, and clean marketable staple half a ton." The same pamphlet states that it has been classed with the best Italian sorts and worth £28 per ton.

Since that pamphlet was written the sample sent by Dr. Sutherland has been further examined and tested by experts, and is now valued at £50 per ton, and my correspondents at Home say that there will be a large demand for it if it can be produced in quantity.

A small sample of the raw material and also of the same fibre bleached and dyed may be seen at my office.

Melilot Lucerne.

MR. B. HARRISON, Burringbar, Tweed River, New South Wales, has sent to the Department of Agriculture a sample packet of seed of melilot lucerne (*Melilotus dentatus*), together with a description of the plant. He writes:—

"This is one of the best fodder plants in Australia, which as yet is but little known. It is stated that it grows profusely, and yields an abundant supply of the most palatable fodder on an island off the coast of Tasmania. It attains a height of 5 and 6 feet, has a shamrock or clover-shaped leaf and small yellow flowers. It has a strong coumarin flavour like newly mown hay, especially when seeding, and it is eaten greedily by horses, cattle, sheep, and pigs; and bees are very fond of it as it is very rich in honey. This plant is very rich in nitrogen and quickly enriches land on which it is grown. It grows well in the poorest soil, is triennial, and maintains itself easily when established, and it has proved a wonderful fodder plant. A farmer in Victoria has tried it with great success on his horses, and another, who has 100 acres of it, says he finds he can keep more stock on it than on a similar area of ordinary lucerne—*Medicago sativa*—and it also makes first-class ensilage.

"A few years ago this island was a desolate place occupied by a few fishermen and woodcutters, etc. A syndicate leased it for cattle raising, and in consequence of a poisonous plant growing there among the grasses the cattle died off, and it was abandoned. Later on a vessel was wrecked on the coast, and among the wreckage washed ashore were some mattresses filled with fibre containing seed. As this decayed the said plant grew and overspread the island. Now the island has a population of 600 souls, and exports weekly 50 head of fat cattle. It is said that melilot has in the course of a few years changed poor sand dunes into dark, almost black, loam. Through its adaptability to grow and yield heavily on poor soil, this plant should prove a great boon to stock-breeders, and within a few years should become world-renowned."

Mr. E. R. Sawer (Director, Experiment Stations), furnishes the following note on melilot:—

"There are several species of melilot in cultivation, all of which contain *cumarin,* which gives them the pleasant odour of new mown meadow hay. When mixed with grass hay they increase its fragrance. *Melilotus alba* and *leucantha* both bear the name of Bokhara clover; the former is called sweet clover in the United States. *M. altissima* is known as Hungarian melilot. *M. coerulea,* the blue or sweet melilot, according to Muller, "forms an ingredient of the green Swiss cheese, which owes its flavour and colour chiefly to this plant."

"Both the Blue Melilot and Bokhara Clover have been successfully cultivated at Cedara, and a considerable acreage of the latter is being grown during the present season both as a seed crop and for green manure. The Blue Melilot made very fine growth in 1904-5, and remained green far into the winter. It produced seed at the rate of 238 lb. per acre and more than three tons of hay. The growth was rapid, the plants were succulent, and the stems remained tender up to the latest stages. It seemed to be one of the most promising of the legumes for our soil and climate, but in 1905-6 grew very poorly and was very disappointing.

"Bokhara Clover has done very well for two years in succession, growing more slowly than the Blue Melilot, but eventually reaching a height of 4 feet to 4½ feet. It has, however, to be cut for hay or forage before attaining that height, as the stems become woody. The plants remained green quite late into the winter and seemed but little affected by frost and drought. In America, Wilson and Smith say: 'If sown in spring a crop may be cut in fall and two or three crops the following season. For hay it should be cut when about 18 inches to 20 inches high. If the same land is to be kept in sweet clover for more than two years, only two crops should be cut for hay each season and the third allowed to form seed.' Stock do not like it at first, but eat it greedily when they have acquired the taste. Bokhara Clover is regarded in America and elsewhere as one of the best green manures.

"The variety *M. dentatus* has not hitherto been tried at Cedara, but is being investigated during the present season."

Other Uses for Lime.

By Alex. Pardy, F.C.S., etc., Analyst.

A correspondent has suggested that since Natal is capable of producing, cheaply, a very good lime, there may be other profitable outlets open to it besides its use in agriculture and for building purposes. Citrate of lime and calcium cyanamide were cited as two instances in which it was employed in the process of manufacture, and it was thought desirable to consider how well we were equipped otherwise for the carrying on of such industries.

The suggestions are well worthy of at least thoughtful regard, as we have at hand all the raw materials necessary for their production; but it remains to be seen how, from a business point of view, each may be made to fulfil the requirements of a paying venture. The lime certainly is to hand in large quantities, but it is perhaps the least to be considered from a financial position. Lemons, limes and oranges are, or can be, grown readily; nitrogen of the air is as unlimited here as on the Continent; we have the water power to generate the electric current; and so are favourably situated in each respect. There are, however, many difficulties in the way in regard to the second industry which have yet to be overcome, as in all initial enterprises many modifications have to be introduced before anything like a harmonious and perfected system is possible. This new industry is in its infancy, and it may be wiser to patiently await the results of those who by their position are better able to lead the way in placing it on a workable and efficient basis. A brief outline of the various processes may, however, lead to a more ready apprehension of the simplicity of the one and the difficulties which have to be overcome in the other.

CITRATE OF LIME.

Citric acid occurs in the free state in the juice of many fruits and is found in comparatively large quantities in the citrus fruits, the lemon and lime being the two principal from which the acid is obtained. The juice from the peeled and seeded fruits, after being squeezed out from these by means of rollers or strongly made presses, is either clarified and then heated to about 100 degs. C. in suitable vessels—usually of copper—or directly heated to this temperature to effect the coagulation and precipitation of the albuminoid matter and prepare it for the addition of the combining agent. To the hot juice, powdered whiting, chalk or carbonate of lime is next added till effervescence ceases. The acid is thereby neutralised; and on standing the insoluble citrate of lime settles out from the treated juices. The supernatant liquid is then run off and the residue is repeatedly washed with warm water and then dried.

This residue consists of impure calcium citrate, and in this form is sold as a commercial article. Citric acid is obtained from the lime salt by adding to it the required amount of hot sulphuric acid, whereby the lime is caused to combine with the added acid to form sulphate of lime and set free the citric acid, which is run off in the overlying liquid after the heavy sulphate has settled out. Both citrate of lime and citric acid attract water on exposure, and in the moist state are subject to decomposition, so that considerable care is required in the drying and packing.

Citric acid is used for various purposes. It is largely employed as a "resistant" in calico printing, in the manufacture of ærated waters, and medicinally; and has a considerable commercial value dependent on its quality and purity. The normal price for calcium citrate appears to be about £40 or £50 per ton, but the price fluctuates, and much higher prices have been obtained.

CALCIUM CYANAMIDE.

Now, a commercial product of some considerable importance is one of the recently introduced nitrogenous manures, and is one result of the search after a fertilizer which may take the place of nitrate of soda. It has more and more been borne in on the minds of men that, as the possibility of a cessation of the world's supply through the exhaustion of the nitrate deposits is within measurable distance, and as this is a fact of such direct and vital importance to mankind, scientists must look to other directions for the production of a substitute which will effectively fulfil the purposes discharged by the natural resources of which we have so long had the advantage.

The two chief nitrogenous manures which have been and are at the present time being turned out are nitrate of soda and sulphate of ammonia. Neither the output nor the consumption of the latter has been as great as that of the nitrate, yet it is an article of very considerable importance. Its supply, however, is influenced by manufacturing conditions which have a natural tendency to limit its production. It has been estimated that the entire yield of this material was in the year 1905 between 500,000 and 600,000 tons, whereas the consumption of Chili nitrate (nitrate of soda) in the same year was 1,567,000 tons,* of which amount about 1,267,000 tons was used for manurial purposes and the balance in manufactories. Hence it will be seen that an enormous amount of nitrogen is required to supply the annual agricultural and trade requirements of the world.

Approximately, four-fifths of the atmosphere is composed of free nitrogen; and it is becoming more evident that it is to this vast source that we will have to look for our future supplies. In its free gaseous state, as it occurs in the atmosphere, it is of no direct value as a food material of plants, and has to be fixed or brought into combination with other elements before it can acquire this property. It is possible to produce many such compounds in the laboratory by inclusion of the free nitrogen, but few of them fulfil the requirements of a commercially produceable article, the cost and intricacies of their manufacture being too great for practical application.

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* Jour. Chem. Ind. No. 12, Vol. 25.

One of the most successful attempts, and one which has already been found capable of producing a useful and fairly cheap article, is that of the preparation of a lime salt known as calcium cyanamide, containing from 15 to 20 per cent. of nitrogen—nitrate of soda contains from 15 to 16 per cent. Its manufacture in the first case involves the presence of calcium carbide, such as is used in the generation of acetylene gas for lighting purposes. This latter material is prepared where an inexpensive source of power is available—such as water power or cheap coal, —by passing a mixture of powdered quicklime and coke or coal dust between the poles of an electric arc whereby it is fused into a compound containing calcium and carbon, according to the equation,

$$CaO + C3 = Ca\ C2 + CO.$$

This material forms a basis for further conversion into the nitrogen salt. When heated to a high temperature in a current of air, combination with the nitrogen of the atmosphere takes place in such a manner that a material containing calcium, carbon and nitrogen according to the following equation is formed:—

$$Ca\ C2 + N2 = Ca\ CN2 + C.$$

When this salt is heated with water under pressure, ammonia is set free; and it has been found that a similar effect is gradually produced when it is placed in contact with moist soil, the ammonia becoming ultimately nitrified.

In some experimental trials it has given results equal to sulphate of ammonia or nitrate of soda, but definite determinations are yet forthcoming before judgment can be finally given. As a top dressing it has been found to be rather injurious in some cases, and also when applied along with the seed in peaty soils a similar effect has also been observed. When applied two or three months previous to sowing the seed, no injurious result occurred.

The nitrogen in nitrate of soda costs in Natal 15s. 10d. per unit, in sulphate of ammonia 15s. 6d., and, according to a trial shipment, that in calcium cyanamide 17s. 10d. per unit.

CALCIUM NITRATE.

This is yet another suitable form in which the nigrogen may be fixed. It is produced by the direct combination of the nitrogen and oxygen of the air by means of electricity. In the producer air is passed into a specially constructed electric furnace in which it is heated to a very high temperature under the influence of an electric arc spread out into a disc-like shape by the action of powerful electro-magnets. A high temperature becomes necessary to increase the efficiency and velocity of the reaction which goes on under these conditions, viz., the formation of oxides of nitrogen. The gases so formed are rapidly cooled, either by sweeping the gases along or interrupting the arcs at minute intervals in order to prevent a reversion of the first reaction.

The gases obtained in this way, and containing from 1 to 2 per cent. of nitric oxide, are conveyed into a series of towers in which they are condensed in water, which becomes more concentrated after each addition of the gas. The gaseous products are hence led into an alkaline solution, such as milk of lime, whereby calcium nitrate is formed. By subsequent treatment with nitric acid this is converted into nitrate of lime. Sodium may be used in place of the lime, but as the latter, is the cheaper material, and produces a better fertilizer, it is more largely used.

This lime compound, although still scarce and difficult to procure in quantity, has been subjected to trials with various crops and has been found as efficaceous as nitrate of soda, having, at the same time, a peculiarity due to the difference in the base.

Calcium nitrate has not yet made its appearance in the open market; and, as it has very substantial merits, it may be inferred that the process of its manufacture has been found to be rather an expensive one, but there is every prospect that this may be modified sufficiently to warrant an extensive output in the future.

Other modes of producing a nitrogen salt are undergoing experiment, the outcome of which may be the production of an effective article at a price below or not greater than that of nitrate of soda.

In both the above processes the chief condition involved appears to be a cheap supply of motive power, and this naturally points to cheap fuel or the harnessing of such a force as that supplied by a natural waterfall. The raw materials are in both cases either inexpensive or, as in the case of the nitrogen and oxygen of the air, free and unlimited.

The technique of the various processes must undergo many modifitions before a perfect system is evolved; but, granted a satisfactory and effective process involving the use of the materials and forces outlined in the above sketch, it may be that we are equally favoured in some respects as, if not more so than, the present home of the new products.

Importation of Plants.

CHARGES FOR EXAMINATION, ETC.

A SCALE of charges which will be levied in connection with the examination, passing, and treatment of all consignments of plants entering Natal otherwise than by post, has been drawn up, with the approval of the Minister of Agriculture. It runs as follows:—

1. An examining fee of 2s. per 1,000 or part thereof shall be levied in respect to every consignment of plant cuttings and stocks (that is young rooted plants intended for the purpose of grafting or budding), a maximum charge of 5s. being fixed in respect to any one consignment.

2. Other than as specified in Clause 1, an examination fee of 2s. per 100 or part thereof shall be levied in respect to every consignment of fruit trees, fruit, plants, and bulbs, a maximum charge of 5s. being fixed in respect to any one consignment.

3. A passing fee of 1s. shall be levied upon all consignments passed without examination.

4. A charge of 12s. shall be levied for the use of the large fumigation house for the fumigation of each consignment of fruits and plants.

5. A charge of 5s. shall be levied for the use of the small fumigation chamber for the fumigation of each consignment of fruits and plants.

6. The examining officer shall issue a receipt in the form set forth in the schedule hereto for any fee levied and paid. Postage or revenue stamps representing the amount of the fee shall be affixed to the carbon copy of the receipt to be filed for record.

7. All labour and appliances, excepting such as are connected with the charging of the chamber with the insecticidal gas, are to be supplied by or at the expense of the consignee or his agents, and any damage to the fumigation house shall be made good by the consignee.

8. All charges are to be paid before the certificate provided for in Regulation No. 6 of the Regulations published under Government Notice No. 449, 1906, is issued.

9. Before the removal of any consignment, the certificate and receipt must be presented to the Customs Office for examination.

SCHEDULE.

The following is the schedule referred to in Section 6:—

O.H.M.S.

No. . . . .

PLANT DISEASES ACT.

Received from . . . . the sum of . . . .
being
Examining fee
Passing fee
Fumigation charge for use of large / small chamber

. . . .
Inspector, P.D.A.

RHODESIAN REGULATIONS.

The Rhodesian Government Notice No. 157, 1907, has been cancelled and the following substituted in lieu thereof:—

"Until further notice no person shall introduce into Southern Rhodesia from the area of Cape Colony, lying east of and including the Divisions of George, Oudtshoorn, Uniondale, Willowmore, Aberdeen, Murraysburg, Richmond, Britstown, Hope Town, Herbert and Kimberley, any nursery stock, ornamental plants and shrubs, fruit or portions thereof, save as is in the next succeeding paragraph provided.

"Any consignment of farm produce (which term shall include articles of consumption grown on a farm other than produce of a vine) may be introduced if accompanied by a certificate of a Magistrate or a Justice of the Peace of the district in which it is produced to the effect that such production was outside a radius of one quarter of a mile from any vine, virginian creeper or plant belonging to the family *vitaceae.*

"If at any time an Inspector shall find any tree, plant, fruit, vegetable, or portion thereof introduced into this Territory in contravention of this regulation he shall order the same to be immediately removed from the Territory, or the Secretary for Agriculture may order the same to be destroyed without delay.

"All permits for the introduction of nursery stock from the aforesaid areas which have been granted under Section 16 of Government Notice No. 141 of 1906 shall be and are hereby withdrawn."

TRANSVAAL REGULATIONS.

The Minister of Agriculture has been advised by the Director of Agriculture of the Transvaal relative to prohibitions and restrictions which are now in force in respect to the importation of certain produce from Oudtshoorn and the Eastern Province of Cape Colony into the Transvaal. The importation of vines and living portions of the vine—such as grapes, raisins (S.A.P.), dried currants (S.A.P.), and nursery stock—and ornamental plants and shrubs, is prohibited. The following produce will only be admitted into the Transvaal if accompanied by a certificate of a Magistrate or Justice of the Peace of the District in which it is produced to the effect that such production was outside a radius of a quarter of a mile from any vine, Virginia creeper or plants belonging to the family *Vitaceae*: Acorns, S.A.; almonds; asparagus; bamboos; barley; beans; buckwheat; cereals; chaff; chicory roots, S.A.; currants; *dagga;* firewood, S.A.; flax; cut flowers; fodder; forage; S.A. forage; hay and straw; S.A. fresh and dried fruit; S.A. fruit pulp; hay; S.A. hops; maize; manioc, S.A.; manna hay and grasses; mealies; millet; moss litter; mustard; *myouti* grain; nuts, foodstuff, S.A.; oats and oat hay; olives; S.A. onions; peas; split peas; S.A. potatoes; reeds; rye; lucerne; lucerne hay and sunflower seeds; straw; S.A. sunflower seeds; tamarinds; tares; S.A. tobacco; lentils; linseed and linseed meal; fresh vegetables, S.A.; wheat; grain not otherwise mentioned; and all other produce not included in either the first list (vines and living portions of the vine, etc.) or the following one of articles of produce not prohibited. The following may be admitted: canned or bottled fruits, jams, jellies and marmalade; oils and oil-seed meals; bran, pollard, hominy, samp, meal, maizena; mealie cobs; pea-flour; live stock; meats, fresh and preserved, including bacon and ham; lard and lard oil, margarine and tallow; hides and leather; groats; milk; butter; cheese and eggs; ostrich feathers; pickles; sugar, golden syrup and honey; vinegar, wine, brandy, stout, rum (if casks, bottles, etc., are properly sterilised and duly certified in accordance with the regulations); malt; and lemon squash and syrup.

In New York there is an Apple Consumers' League, organised to promote the apple-eating habit. It costs nothing to join, and there is no constitution to tie members down. "You just agree," says the *Rural New-Yorker,* "to eat at least two apples every day and to call for apple in some form whenever you eat at any public table. If the proprietor doesn't serve apple you agree to find fault with him for not doing so. Every member is president, with headquarters in every member's mouth. That is all there is to it, but this simple unorganised work of apple eaters has, we firmly believe, increased the consumption of apples by at least 20 per cent. Our aim is to make apple-eating fashionable, and also to teach people that it is more patriotic to eat the true American fruit than to use imported oranges or bananas."

Export of Mealies.

SOME ENGLISH VIEWS.

A COPY cf a letter written by a well-known firm of brokers in Southampton to Messrs. Donald Currie & Co., Ltd., London, relative to South African maize exportation, has been received. The writers have some interesting comments to make on the subject, and their letter should be read with interest by all South African exporters of mealies. The letter runs as follows:—

"We have had two or three lots of this (Cape) maize, and the last little parcel of 50 tons was *white* maize, and we think this variety should command a fair sale both here and in London. Maize of this particular quality and colour we think would generally become popular with makers of proprietary articles used for human food and for brewing. It is a little difficult to say what its relative value would be with maize of somewhat similar character grown in the United States and the Argentine; but we think commercially it would always hold its own with similar maize from these countries.

"The yellow description, which we have also imported, would be in more direct competition with yellow maize from Argentine, America, Russia, Roumania and North African countries, and also occasionally with maize from India. We hardly think this yellow maize would be considered as valuable as that usually grown in Russia, but it should be somewhat on a par with the maize grown in the North African States and that usually obtained from the Argentine. It would be used here for cattle feeding, but not so much for the proprietary articles and manufacture of products used for brewing. If it were found that Cape growers could produce yellow maize to more profitable advantage than white, then we imagine they should turn their attention to obtaining, if possible, a maize smaller in berry than their yellow maize appears to be, and it might be worth while to experiment with seed maize from some of the European countries which produce the finer and smaller varieties. Of these descriptions perhaps the more valuable would be the yellow maize known as "Cinquantino" or "Bessarabian," and if this would not acclimatise in South Africa, they might try maize grown in India. We could not venture an opinion as to whether the more valuable descriptions of maize would answer in South Africa, or whether they would crop as well as the larger variety, but at present they command more money than the larger yellow sorts.

"With regard to prices, maize, like wheat, is subject to very considerable market fluctuations. With maize growing countries producing large crops, the price naturally must go down, and correspondingly with partial or sometimes almost entire crop failures in one or several of the maize producing countries, the price advances. At the time of writing we regard maize as high in figure, it being worth 24s. to 24s 6d. per 480 lbs. at Southampton to first hand importers, and merchants are selling here today to their customers at 25s. to 25s. 3d. per 480 lbs., the difference being profit and expenses. We give you with this the relative prices that have obtained for maize in the corresponding month for the last five years, which will give some idea of values. Should the import grow rapidly for the white description, then the price of this would be very little over that obtained for the yellow, as after manufacturers of proprietary articles were satisfied (who would, we think, give a preference to have this maize), it would come in direct competition for cattle feeding, and we do not think it would command a higher price for this purpose. . . .

"With regard to carrying this maize, the manner in which the 50 tons arrived and was bagged was quite satisfactory. If sewn in strong bags there should be practically no loss whatever in transit, and consequently no allowances for loose collected maize and sweepings.

"We find with old crop maize from most countries there is a good deal of difficulty and depreciation in value owing to the attack of weevil, a most destructive insect which plays havoc with maize. This is probably well known in South Africa. There is very little trouble with new corn, but if it is stored in large bulk and weevil get into it, they do very considerable damage in a short time."

A cow belonging to John Blackburn, of Pennsylvania, U.S.A., was taken sick and died. A *post-mortem* brought to light the following causes: 38 nails (from lath nails to spikes), one corset steel, 9 collar buttons, 3 glove fasteners, 7 screws, one lead bullet, one empty shell, one silver watch chain, one suspender buckle, and ten feet of fine wire in coil.

A simple method of testing the genuineness of salts sold as nitrate of soda is to take a little—say a dessert spoonful—of the nitrate and place it on a small, perfectly clean shovel, and then put the same over an ordinary fire, with the bottom of the shovel directly upon or very close to the fire. If the mass melts readily in all probability it is nitrate of soda. If it does not melt it is some other salt. If it crackles without fusing or melting it is probably common salt.

Agriculture in the United States.

CONDITIONS IN 1906.

"ECONOMIC revolution in the science and art of agriculture, which became noticeable in this country half a dozen years ago, has continued during 1906, with tremendous effect upon the nation's prosperity. Crops so large as to be beyond any rational comprehension have strained the freight-carrying ability of railroads. Directly and indirectly the farmer has set up a demand for iron and steel that has exceeded the productive power of the chief producer among nations. His contribution to the supply of loan capital has been beyond calculation and recalls the fact that the depression in the loan and investment market of 1903 was cleared away by the following crop. Meanwhile the farmer has been a generous consumer, and has given powerful support to the market of the industrial producer, to the trade of the merchant, and to the wages of the working man."

A condition of things betokening a national strength and general welfare is pourtrayed in these sentences, taken from the last Annual Report of the United States Secretary for Agriculture. In that great country almost an ideal state of affairs seems to have been reached—a state towards a similar realisation of which South Africa, having awoken from decades of *laissez-faire,* is now earnestly striving—namely, a quickening of the pulses of national activity bv a large circulation of wealth obtained from the soil.

A good idea of the progress America is making, agriculturally, can be obtained from a perusal of the Annual Reports of the U.S. Department of Agriculture for the year 1906. Taken at that point in production at which they acquire commercial value, the farm products of the year, estimated for every detail presented by the census, had a farm value of £1,415,416,666. This is £101,041,666 above the value of 1905, £132,291,666 above 1904, and £182,708,333 above 1903. A simple series of index numbers shows the progressive movement of wealth production by the farmer. The value of the products of 1899 being taken at 100, the value for 1903 stands at 125, for 1904 at 131, for 1905 at 134, and for 1906 at 144. An examination of the items of the grand total of wealth produced shows that most of the increase over 1905 is due to horses and meat animals. Crops, in a general balance of gain against loss in value, in comparison with the crops of 1905, made a fairly substantial gain—£4,583,333; so that the previous record year in the value of products, 1905, was exceeded by 1906 in both crops and animal products, and thus the latter year became the leading one in value of farm products in the history of the country by £101,041,666 over 1905.

Taking the chief crops in order of value, we find that by far the most valuable crop in 1906 was maize, reaching 2,881,000,000 bushels, of a value of £229,166,666. The cotton crop, fibre and seed combined, follows maize in order of value, although it was only three-fifths the value of the maize crop. In Texas alone the cotton crop is greater than that of British India and nearly three times that of Egypt, and it is half as much again as the crop of the world, outside of the United States, India and Egypt. Hay approached £125,100,000 in value. Wheat came next, followed, in order of value, by oats, potatoes, barley, tobacco, sugar (beet), flax seed, rice, rye, and hops.

The exports of farm products amounted in value to 976,000,000 dols. (equivalent to over £203,300,000) during the year ended 30th June, 1906. This is said to be the largest amount ever reached by agricultural exports from the United States or any other country, and exceeded by 24,000,000 dols. the exports of 1901, which had previously been the record year. Cotton maintains its long lead over other chief exports, with a value of 401,000,000 dols.

The so-called balance of trade in the international exchange of agricultural commodities continues to run in favour of the United States by an enormous amount; for 1906 the agricultural exports exceeded similar imports by 433,000,000 dols.

"Farmers are using their new capital to abolish the waste places of the land," says the Secretary for Agriculture in his Report. "The river is leveed and alluvial bottoms subject to overflow become worth hundreds of dollars per acre for vegetables; a marsh is drained by ditches and tiles and celery makes it the most valuable land in the country; semiarid land is constantly cultivated so as to make a mulch of finely pulverised earth on the surface, and the crops that it will grow make the farmer prosperous; durum wheat or alfalfa [lucerne] is introduced and again the semi-arid wastes are made to do the will of the cultivator; leguminous plants give humus and nitrogen to the sandy waste, to the use and profit of the farmer; the unused rocky, stony field or mountain side, offensive both to the economic and to the aesthetic eye, blossoms with the apple, the peach, the pear, and the plum, and adds to the evidences that every square foot of the land may be made productive unless it is arid; and even then irrigation works, as far as water is available, swell the evidence. Along all of these lines of production farmers are using their newly acquired capital and are progressing as never before in their prosperity. . . .

"The farmer's standard of living is rising higher and higher. The common things of his farm go to the city to become luxuries. He is becoming a traveller; and he has his telephone and his daily mail and newspaper. His life is healthful to body and sane to mind, and the noise and fever of the city have not become the craving of his nerves, nor his ideal of the everyday pleasures of life. A new dignity has come to agriculture, along with its economic strength; and the farmer has a new horizon far back of that of his prairie and his mountains, which is mo promising than the sky-line of the city."

Agricultural Machinery.

A NEW BINDER.

A RADICAL modification in binder construction has, we learn from the *Implement and Machinery Review,* been carried out by Mr. Samuel Millar, a practical farmer of Otago, New Zealand, who is said to have spent four years evolving a new type of harvester.

The main features claimed for the new harvester are that there are no canvases (in itself a great saving), and there is not a clog on the machine. The crop is cut, conveyed to the binder, and tied and discharged—all on the vertical. The machine has neither spur wheel nor chain, and is simplicity itself. The driver works the entire contrivance without having to move from his seat. It has been found to act to perfection in short crops, and especially in rye grass, and it is claimed that it will cut and tie anything from 6 inches in height upwards. The ordinary harvester weighs from 16 cwt. to 1 ton, but Mr. Millar's patent weighs only 9 cwt., and will probably be made considerably lighter. It is stated that two horses are able to draw it without strain for eight hours, which is a vast improvement on existing conditions. The yoke—itself a valuable invention—is on the pulley system, and so arranged that each horse is made to do its fair share of pulling. The main drive wheel is 4 ft. 6 in., but can be geared up to any requirement; and the raising or lowering of the cutters is regulated by means of a lever manipulated, like everything else, by the driver from his seat. The knotter is another remarkable patent connected with this machine. It is much simplified, and has no bevel wheels to get out of gear.

This harvest-binder has come through many preliminary trials successfully, and is to be put through sundry other exhaustive tests during the next harvest.

A company with a capital of £6,000 in 240 shares of £25 each has recently been registered to acquire the patent.

Tobacco International Exhibition.

A COMPETITION FOR COLONIAL LEAF.

We print below a letter which has been received by Mr. E. R. Sawer, Director of Experiment Stations, relative to a proposed open competition for Colonial leaf, to be held in conjunction with the Fourth International Tobacco Trade Exhibition next March. Awards are to be made for tobacco leaf grown in British Colonies, and the Empire generally, including Cape Colony, Transvaal, Rhodesia, Natal, Sierra Leone, British Honduras, Zanzibar, Trinidad, Jamaica, Fiji Islands, Straits Settlements, Bermuda, India, Ceylon, Canada, British Columbia, Australia, New Zealand, British North Borneo, Cyprus, Malay States, and Ireland,—the judges consisting of well-known London tobacco brokers and manufacturers.

The letter runs as follows:—

"A correspondence has appeared in several London newspapers expressing regret that Colonial-grown leaf tobacco was not more in evidence at the Tobacco Exhibition held at the Royal Horticultural Hall, Westminster, last April. It is true that the Government of British Columbia had an important exhibit which excited much interest, but apart from this there was very little Colonial-grown tobacco shown.

"The Management of the Tobacco International Exhibition have decided, in view of the obvious interest of the public and the trade in tobacco, which it is thought might be grown more extensively in several British Colonies, and in view of the higher prices which have been demanded for the tobaccos coming from the American Continent which largely supply this market, to encourage at the Exhibition to be held towards the end of March, 1908, the display of Colonial leaf tobacco.

"With this object in view, a few simple conditions have been drawn up, under which samples of Colonial tobacco weighing about 4 lbs. each will be received and properly described and shown at the Exhibition without any charge whatever to the grower. In enclosing these conditions for your perusal, the Management respectfully ask for your kind co-operation in order that the scheme may be brought to the full notice of the tobacco-growers in the Colony which you so adequately represent.

"This is absolutely the first time in which organised arrangements have been made to show in London, side by side, the tobaccos produced by our British Colonies, and it is hoped and believed it may lead to what are now comparatively unknown tobaccos finding an advantageous outlet in the London Market.

"The samples will have the great advantage of the careful examination of a Committee of Experts who are leading London tobacco leaf merchants and manufacturers competent to recognise not only the individual merit of the respective samples, but to also point out in what respect a particular sample is defective and to suggest improvements."

In the printed circular enclosed with the letter it is stated that competing samples should weigh about four pounds and should be sent, carriage paid, to reach London not later than 15th March, 1908, addressed to the Manager, Tobacco International Exhibition, 2, Monument Station Buildings, London. The Manager of the Exhibition will pay the duty, and the samples will become his property after the Exhibition unless otherwise arranged. Samples should be packed in such material as oilskin or tinfoil, to prevent exposure to the air. Full particulars and description must accompany each sample, and extracts will be printed in the official catalogue. The importance of this is also to allow the Exhibition Authorities to properly label the samples. The labelling will be done by the Exhibition Management from the particulars supplied. The price at which the leaf is usually sold is to be stated by senders.

Colonial and Foreign Governments and merchants desiring to make a display of leaf tobacco on a larger scale than that afforded by the Open Prize Competition may take a space to exhibit, say, 100 lbs. of leaf tobacco, at a cost of £10; or a space suitable for a larger exhibit, say, 500 lbs., at a cost of £20.

The Exhibition is to be held in the Royal Horticultural Hall from the 20th to the 28th March next, inclusive. Persons desiring further information are recommended to communicate with the Manager at 2, Monument Station Buildings, London.

The *Mark Lane Express* contains a reminder that cattle cakes and other concentrated foods should not be stored in unsuitable places, otherwise they are liable to lose part of their value. The warehouse should be airy and dry. As a rule, cakes should not be stored over a stable or shed, where the warm air permeates, nor in a place where fodder is steamed. It is not an uncommon occurrence that the results obtained from the cakes are not so satisfactory as might be expected from their high quality, and the cause is due to their deterioration through bad storage. Moreover, if cake is kept in a damp place it may get mouldy and be absolutely injurious to stock.

The Land Board.

ANNUAL TOUR OF INSPECTION.

On the 22nd October the monthly meeting of the Land Board was held. Several applicants for the small farms which have been laid off at Winkel Spruit personally supported their applications and succeeded in passing the Board. At the end of October five of the Winkel Spruit blocks remained unallotted. Two applicants were received for land in Zululand, one of whom succeeded in passing the Board. The consideration of the case of the other applicant was held over pending the receipt of certain documentary evidence which is required in connection with the application.

WINTERTON SETTLEMENT.

Leaving Maritzburg on Wednesday, 23rd October, the Board arrived at Winterton the same afternoon, and set out immediately on an inspection of the blocks lying under the small furrow. The settlers appeared to be making

Satisfactory Progress.

A fine crop of wheat and also a young crop of tobacco were seen. Winterton tobacco, grown and cured by Mr. Joseph Pearse, is obtaining quite a reputation. In the evening a meeting of the Board was held in the dining-room of the local hotel.

The following morning at 7 o'clock the Board set out on an inspection of the lots lying under the main furrow. Each block was visited and an inspection made of the crops. The forage crops were very good and should realise remunerative prices. On Sub-division "A" of Lot 18 Mr. Anderson has planted an orchard of 3,000 trees, which should be bearing in the course of two or three years. The settlers appear to be at last making headway and are optimistic as to the future of the settlement. In the afternoon a public meeting was held, at which thirty-three blockholders and local residents were present. The most important subject discussed was the question of the conversion of the present leases into freehold, which has been provided for by Act 27, 1907, passed during the last session of Parliament. The question of laying off a number of dry farms of at least 300 acres was also brought up for consideration.

An interesting sight was to be seen at the Winterton station on Thursday, where a number of wagons laden with mealies intended for export were being off-loaded. Up to the end of October, upwards of 12,319 bags had been forwarded from the district. It is anticipated that, in view of the prices which are being realised in England, a considerably larger area will be planted during the coming season than hitherto.

VARKENSFONTEIN.

On Friday morning the Board left Winterton at 7.30 and drove through the settlement, *en route* for the farm "Varkensfontein," which is situated in the vicinity of Colenso. The Board made an inspection of the farm, which it is proposed to sub-divide and throw open for selection by persons of European descent. It is probable that "Varkensfontein" will be sub-divided into nine or ten farms. The farm, which contains good arable land, adjoins the Colenso township, and it is more than probable that the sub-divisions will be taken up within a week or two of their being thrown open for selection. On Friday night the Board interviewed an applicant for one of the sub-divisions, and also held a meeting at which were discussed certain points arising out of the public meeting held at Winterton.

WEENEN SETTLEMENT.

The following morning the Board entrained for Weenen, and arrived at the settlement in the afternoon. The same evening, a public meeting, attended by between 40 and 50 persons, was held in the Court Room, which was kindly placed at the disposal of the Board by the local Magistrate. The meeting was presided over by Mr. Acutt, the Chairman of the Board. Among those present were the Right Hon. F. R. Moor (Prime Minister), Mr. C. G. Jackson, the Magistrate of the Division, and Mr. E. R. Sawer, the Director of Experiment Stations.

Before proceeding with the business more particularly affecting the blockholders in the Upper Settlement, Mr. Sawer addressed the meeting on the subject of the cultivation of tobacco. Tobacco thrives particularly well at Weenen, and, with a view to encouraging the cultivation of the plant, and its proper curing, the Government has erected a curing barn, which is capable of dealing with five tons of leaf at one time. A proposal is now on foot with a view to the establishment of a Co-operative Tobacco Growing and Curing Association.

Arrear Instalments.

The next question brought forward for consideration was one relative to the payment of the instalments of purchase price of the blocks in the Upper Settlement, which, it is regretted, have fallen into arrear. The blockholders have now proposed, with a view to bringing the arrears up to date, to arrange for the sale of their produce through an approved agent, and for the payment of a certain percentage of their receipts to the Board, in liquidation of their arrears. The further consideration of the details of the proposed scheme was entrusted to the Advisory Committee, which met the Board on Monday evening and went fully into the matter. The conclusions arrived at are now being laid before the Government. The question of the rail carriage on lucerne despatched to Maritzburg and Durban was also brought before the Board. Before the meeting was closed it was briefly addressed by the Prime Minister.

On Sunday morning the Board was conducted over the Government experimental blocks by Mr. Sawer. The Board was much impressed with all it saw. The wheat and barley crops were particularly fine, and presented a good object lesson in what could be produced with scientific cultivation. Lot No. 34 has been laid out as an orchard and presents a very fine appearance.

After an early breakfast on Monday morning, the Board set out on an inspection of all the lots under the Upper Furrow. Each block was visited, the Board being conducted over the several blocks by the respective holders. Many of the settlers have gone in extensively for

LUCERNE CULTIVATION,

and are now beginning to derive considerable benefit from their crops. There is no doubt that Weenen is particularly adapted to the cultivation of lucerne, which is now being baled in the village and despatched to the Maritzburg and Durban markets in large quantities. Forage has also been extensively grown and realises a fair return. Tobacco is largely grown in the settlement and several acres of Lot 18 have been laid off by Mr. Slatter in vines. The Board returned from its inspection late in the afternoon much gratified with what it had seen during the day. There is no doubt that the settlement has turned the proverbial corner and is now well

ON THE WAY TO PROSPERITY.

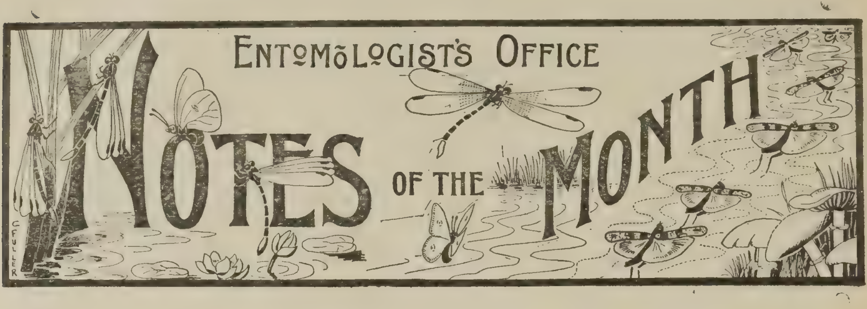
On Tuesday morning the Board entrained for Maritzburg after a very successful tour.

The Minister of Agriculture, the Hon. W. A. Deane, had intended accompanying the Board on its tour of inspection, but he was unavoidably prevented from doing so owing to an urgent call to Dundee in connection with East Coast Fever.

Persons desirous of applying for any of the farms which have been laid off at Winterton, on the Oribi Flats, in the vicinity of the Umtamvuna, and in the neighbourhood of the Umhlatuzi, in Zululand, should communicate with the Secretary to the Land Board in Maritzburg.

We understand that it is also proposed to throw open the Nonoti Mission Lands, which have been sub-divided into farms of approximately 400 acres each.

Great Britain's annual import of apples is stated to be nearly 9,000,000 bushels. One-half of this amount goes there from the United States. The total from all the British possessions is under 4,000,000 bushels: Canada's share is about 3,000,000 and Australia's nearly 500,000.



Locusts in October.

THE movements of locust swarms throughout the Colony during the month of October are shown in the following table. X represents settled swarms, and O circling swarms:—

Date.	Locality.	Flight.
	1ST WEEK.	
1st	Eshowe (village)	N E
	Ixopo, Riverside	W, O
	Vryheid, Alpha	N W
	Vryheid, Leeunek	S
	Umhlali	O
2nd	Greytown, 2 swarms	N W
	Greytown	S W
	Eshowe (village)	X, N W
3rd	Mtunzini (village)	S E
	Greytown	S
	Tongaat	W
4th	Eshowe (village)	S W
5th	Weekly Police Reports—	
	Nondweni and Lower Biggarsberg none since last season. Ematimatole, Babanango, Nqutu, Ndumu, Verulam, Ingwavuma, Malvern, Mehlomnyama, and Avoca	Nil
	2ND WEEK.	
6th	Eshowe	S
7th	Umhlali	N
	Tongaat	N
8th	Mapumulo	N
	Mtunzini District. Many large swarms, laying eggs	
8th	Eshowe Division, pairing	N
9th	L. Umfolozi, Empangeni, pairing	S
	Eshowe (village), pairing	S
	Avoca	N
	Mt. Edgecombe	X
	Isipofu	S W
	Pinetown	S
	Ottawa	S
	Murchison	E
	Port Shepstone	S
	Port Shepstone, Umhlangeni	S
	Batstones	S
	Port Shepstone	S
	Batstones	S
	Mseleni	N E

Date.	Locality.	Flight.
	2ND WEEK.—*Continued.*	
10th	Tongaat	O
	Red Hill	N E
	Krantzkop : Salem	O
	Eshowe, scattered all over Div,	
	Ingwavuma	N E
	Mseleni	N W, W
11th	Mt. Edgecombe	Eggs
	Darnall	Eggs
	Riet Valley	X
	Umvoti R., Glendale	X
	Umzumbi	N E
	Hillarys	S
12th	Pinetown	N W
	Verulam	W
	Stanger	W-N, E
	Northdene	O
	Malvern	S
	Avoca	X
	Eshowe	N E
	Mehlomyama	S W, O
	Isipingo	S
	Pinetown	S E
	Eshowe, laying all over district	S
	Mt. Edgecombe, eggs laid	X
	Vryheid, Reitfontein, eggs laid	X
	Nongoma, about to lay	S
	Amatikulu, laying heavily	X
	Empangeni, laying heavily	X
	Mseleni	N W
	Mseleni	S S W
	Weekly Police Reports—Babanango, Hill Crest, Ematimatolo, Umvoti Poort	Nil
	3RD WEEK.	
13th	Verulam	S E
	Malvern	S E
	Pinetown	E
	Umhlali	S
	Eshowe	E
	Umhlangeni	N
	Isipofu	S
	Westville	S
14th	Verulam	N E
	Mt. Edgecombe	E

Date.	Locality.	Flight.
	3RD WEEK.—*Continued.*	
14th	Malvern	S E
	Umhlangeni	N
	Isipofu	S
	Mtunzini	O
	Eshowe, laying eggs	X
	Mehlomnyama	X
	Lower Umfolozi, eggs	X
	Stanger, Doesburg	X
	New Guelderland, eggs	X
	Stanger, about to lay	X
	Westville, pairing	S
15th	Groutville	S E
	Malvern	S
	Darnall, still laying	X
	Inanda	W
	Mt. Edgecombe, still laying	X
	Mehlomnyama	O
16th	Bowkers	S E
	Sydenham	S E
	Richmond	W
	Hillarys	S
	Camperdown	N E
	Mapumulo, laying	X
	Verulam, pairing	X
	Table Mountain, pairing	X
	Ingwavuma	X
17th	Krantzkop, eggs	X
	Avoca, laying	X
	Camperdown	X
	Inchanga	N E
	Stirk's Spruit	X
	Harding (lot R)	S
18th	L. Umkomaas, Ellingham, laying	X
	Glendale	X
	L. Umkomaas, Amahlongwa	X
	Dumisa, pairing	O
	Ubombo, Tegana, eggs	X
	Paulpietersburg	S E
19th	Tongaat	X
	Umbogontwini, Isipingo, pairing	X
	Mapumulo, Isitondu, eggs	X
	Ubombo	E
	Weekly Police Reports—Ndumu, Nqutu, Ematimatolo	Nil

Date.	Locality.	Flight.
	4TH WEEK.	
20th	Avoca	X
	Mt. Edgecombe, laying	X
	Illovo River	S
	Mehlomnyama	X
	Krantzkop, Speckfontein	X
	Westville	S
21st	Verulam, eggs	X
	Tongaat, eggs	X
	Sydenham, locusts flying S E all the week	
	Lower Illovo, eggs	X
	Vryheid, Black Umfolozi, laying	X
	Umzinto	S W
	Winkel Spruit	S
	Umzinto	S
	Murchison Flats, expected to lay	X
	Sea View	W
	Mapumulo	S
	Pinetown	E
	Westville	S
22nd	Equefa	S W
	Umhlali	S
	Winkel Spruit, continuous stream	S
	Scottburg, Umlazi M.R.	N
	Bowkers	O
	Verulam	N
	Umzinto	S
	Vryheid, Nhlozatshe, laying	X
	Pinetown, pairing	X
	Sea View	E
	Beaumont	E
	Umtwalumi (2 swarms)	S W
	Richmond	W, O
	Clairmont	N E
	Isipingo	O
	Westville	S
	Noodsberg	S E
	Adam's Mission Station	N
	Louwsberg	S E
23rd	Umzinto	S W
	Sea View	W
	South Coast Juncion	W
	Lower Umkomaas	N
	Bowkers	S E
	Pinetown	W
	Umzinto	N
	Isipofu	X
	4TH WEEK.—*Continued.*	
23rd	Babanango	Nil
	Vryheid, White Umfolozi, eggs	
	South Coast Junction	N
	Vryheid, Waterfall	X, S E
	Krantzkop	S
	Bellair	N
	Westville	S
24th	Isipofu	S
	Pinetown Bridge	N E
	Nduma, Hill Top, eggs, starting to move	S
	Ingwavuma, pairing	N E
25th	Richmond, eggs	S E
	Tongaat	X
	Glendale Valley, several swarms	X
26th	Avoca, laying	X
	Lower Umkomaas, laying	X
	P.P.Burg, Nooitgedacht	E
	Boshoff Drift, Alfred,	N E
	Nqutu	Nil
	5TH WEEK.	
27th	Hillcrest	X
	Umzumbi Rail	S
	Esperanza, Beneva, eggs	X
	Ifafa M.R., eggs	X
	Pinetown, eggs	X
28th	Umzumbi Valley, pairing	X
	Richmond, pairing	S
	Leeunek, Ntabankulu	N E
	Mehlomnyama	Nil
29th	Richmond, Waterfall, eggs	
	Umlazi Location, W. Boundary, eggs	
	Intambo's Location, eggs	
	Tim Ogles Location, eggs	
	Junction of Illovu and Umqualumbi, eggs	
	Ifumu, Isipingo	
	Leeunek	N E
	Babanango	Nil
30th	Krantzkop, Siblobo's Location, eggs	
31st	Alexandra Locations, Nos. 4 and 6, eggs	
November.		
1st	Umtwalumi, laying	O
	Noodsberg	E

LOCUST EXTERMINATION.

In view of the extensive deposits of locust eggs in Zululand and parts of the Colony, and the presence of many swarms of locusts which have not yet laid eggs, it has been thought expedient to outline the policy of the Department of Agriculture in connection with the general administration of the Locust Extermination Act, and with the destruction of locusts appearing upon Crown lands, native reserves, and locations. It has been found impracticable to appoint locust officers to supervise the work of locust destruction in settled areas upon lands owned by or occupied by Europeans, Indians, and Natives. Consequently, all farmers and other occupiers of land are relied upon to report either to the nearest Police Station, Magistracy, or to the Chief Locust Officer, any case of negligence coming under their notice in settled areas. Local farmers and agricultural associations are relied upon to encourage an active campaign against hoppers in their spheres of influence.

In order that the law may be enforced as thoroughly as possible, the Government will place the prosecution of defaulters in the hands of the Natal Police, the members of which force are to be appointed *ex officio* officers under the Locust Act. Instructions are being issued for the prosecution of all offenders.

Arrangements are now well forward for the destruction of locusts in the following Divisions and Locations, so far as departmental work is concerned:—In Zululand: Ndwandwe, Hlabisa, Emtonjaneni, Lower Umfolosi, Eshowe, and Mtunzini. In the Northern Territories: Ngotshe and Vryheid. In Natal: Tugela, Mapumulo, and Umlazi Locations; also the Locations of Alexandra and Lower Umzimkulu Divisions. In all 20,000 ℔. of poison, 30,000 ℔. of sugar, and 720 gallons of treacle, together with a fresh supply of spray pumps, have been railed forward to centres in the threatened areas, and further supplies are in readiness for districts in which egg-laying is expected in the course of the next few weeks. Data regarding the movements of locusts and the depositing of eggs are being satisfactorily collected by means of the free locust postcards. Since August, 524 of these reports have been received and tabulated by the Entomologist. Farmers and others who are willing to help the Department in the collection of this important information, and who are not in possession of postcards, are requested to apply to the Government Entomologist for a supply of the same.

As far as is expedient, and consistent with economy, the Department will place on sale at various centres a supply of arsenite of soda. Farmers are expected, however, to make early application to the Government Entomologist for their requirements, as it is impossible to distribute supplies at many centres. Pumps will not be supplied by the Government. Poison may be obtained, rail free, from the head office stores at 25s. per 50 ℔.

drum, or at 4s. per tin of about 7 ℔., but no application for an issue of over 500 ℔. will be entertained, nor will any poison be issued except upon prepayment.

LOCUST FUNGUS.

South African Success.

Mr. H. D. Hawkesworth, Esperanza, writes:—

"You may be interested to know how the fungus is working among the locusts down here.

"I have been applying the fungus to the swarms for many years now, and the result is always good. I collect the dead locusts, dry them in the shade, and put them in tins for future use when required. When the locusts come to lay I choose a cold or wet day and rub up a lot in warm water and sugar (locusts like sweet things), put in an open tin; then catch the couples, dip them well, and let them go. About the fourth day the locusts begin to die. Then I collect these and do a lot more, and they die in quantities. Fresh swarms come in and get the disease, and then carry it all over the country. This month I noticed lots of dead locusts six miles from where I started the fungus. It weakens a swarm at once; and I notice that some of the females are too weak to lay their eggs. The fungus will break out in the hoppers later on and destroy them completely. It works best in damp weather, but dry, hot weather does not kill it.

"Locusts laid great quantities of eggs on my farm the end of October; but to the best of my belief all the eggs have been destroyed by the fly. Every lot I dig up is a mass of maggots.

"I send you some dead locusts. Damp them well and put them in a dark place: the fungus will soon appear."

[The fungus had already appeared when the locusts arrived.—C. F.]

Recent Trials in India.

Several trials have been made in India, in the past, of the South African locust fungus for the destruction of locusts. Tubes of the fungus were obtained from this country in 1899, and the supply was propagated at the Mukhtesar Bacteriological Laboratory for distribution to officers for testing its effect on the occurrence of locust plagues. The results of these trials were, however, negative; and in 1902 the Indian Government decided to discontinue the issue of the fungus tubes, pending the result of further investigation and experiments. Early in 1906 six tubes containing pure cultures of "locust fungus" (*Mucor exitiosus* Massee) were obtained through Mr. Claude Fuller, Natal Government Entomologist. Experiments with this fungus were conducted on the Bombay Locust (*Acridium succinctum* Linn.) and the Black Spotted Grasshopper (*A. aeruguosum* Burm.) during the end of April and first part of May, 1906, and upon the North-West Migratory Locust (*A. peregrinum* Oliv.) and the Rice Grasshopper (*Hieroglyphus furcifer* Serv.) in July; and a report has lately been issued by Dr. E. J. Butler, Imperial Mycologist, and Mr. H. M. Lefroy, Imperial Entomologist, who conducted the experiments at the Pusa Research Institute.

The conclusions arrived at are that, judging from the results of the experiments, the fungus does not appear capable of making a good growth, even when inoculated into wounds, on *A. aeruginosum* or *A. succinctum,* but that it does grow on the North-West Migratory Locust to some extent; that the spores may be eaten with impunity by all the species tested; and that locusts, living in a moist atmosphere charged with spores, flourish even when sprayed with the spores. The only indication of success in any of these experiments, the writers remark, is the death of the three North-West Migratory Locusts (*A. peregrinum*). As against these deaths being due to the fungus, are the facts that in one of the experiments the dead locusts were proved incapable of transmitting infection, and that no trace of the fungus could be discovered on the dead bodies, which were incubated, except on that used in the experiment referred to. "The method is too uncertain," the writers conclude, "to be of any assistance in the field, where nothing but the most virulent infective power is likely to be of value. The conditions in nature are much more in favour of the insect, and against the fungus, than those under which the experiments were made, and if we can only anticipate a small percentage of infections the method will certainly fail. Against the Bombay Locust, the Black Spotted Grasshopper, and the Rice Grasshopper, it is entirely useless."

[Investigations recently conducted in the Transvaal by Mr. S. Pole-Evans, the Government Mycologist, have conclusively shown that the locust fungus propagated artificially in tubes and known as *Mucor exitiosus* is a true saphrophyte which only grows upon the bodies of dead locusts and cannot be induced to grow upon live locusts. Further, the fungus which destroys the locust (*Empusa grylli*) is a parasite which grows only upon live locusts and cannot be propagated in artificial media. This fact helps to explain the general want of success in the trials of what is called South African locust fungus by investigators not only in India but also in Australia and North and South America, and the success which a number of local people have met with (as in the case of Mr. Hawksworth, whose letter appears above), by the use of locusts which have died of the true fungus.—C. F.]

THE KEEVER BEETLE.

The following letters on the subject of the Keever beetle (*Heteronychus arator,* Fron.) have been received from Mr. J. H. Lilienthal, of Dronk Vlei, who has before drawn the attention of this office to the insect. Though the pest seems quite uncommon in Natal, it is a well-known pest in the eastern parts of Cape Colony, where it goes by the popular name of the "Keever Beetle." It is said to be very widespread, and generally injurious, especially to wheat. As in the case of the mealies, it destroys wheat by eating away the roots beneath the soil. According to Miss Ormerod, the Keever beetle deposits its eggs in the soil, and the grubs are equally as destructive as the adults. It is said that "the insects never attack grain sown in ground that is newly broken up, even though it be within a yard of their old scene of operations. The ground must have been cultivated two or three years before they attack the crops on it."

The Keever beetle is about three-fifths of an inch in length. It is quite black, oval in outline, and very convex. It belongs to the family *Dynastidae* and has a very general resemblance to a number of small dung beetles.

Writing under date 1st November, Mr. Lilienthal says:—

"Enclosed I send a phial containing grub of *Heteronychus arator,* for which you asked some considerable time ago. The grubs were turned up from a depth of about two inches from *grey* soil; two beetles were also observed. The reason that I never came across the grub before this is that my present cultivations of more than 200 acres consist chiefly of rich river soil (bottom lands), in which the beetle has never been observed. Only about 10 acres are grey soil; and from what I saw to-day I do not think it possible that a crop will be gathered. However, I shall simply throw these few acres out of cultivation once more; and, having more bottom lands at my disposal, it is easily understood that personally I shall be little concerned about this pest. But as in this locality, perhaps elsewhere in the Colony, many grey soils are cultivated, it can do no harm if I state my opinion on the most practical way to exterminate the beetle.

"From what I can gather, all grey soils here are infested with beetle; I have heard of no river soil. This may appear strange to you, but should you come to Dronk Vlei, my homestead is alongside Inconza, Natal-Cape line, and within easy reach of my cultivations, so that it will be no trouble to investigate.

"The beetle having become so numerous now, and taking into consideration its habits, which I have previously described, it is impossible to take action against the adult. The only feasible way seems to me to apply winter-cultivation, and through continual stirring of the soil destroy grub and pupa. Almost all tillage implements—plough, float, drag and disc harrow—will do good service in this direction. Perhaps the frost in this country is too light, and that exposure to same will assist much in the destruction. You will observe that almost the slightest touch will rip open the grub. In my case of cultivation this day, the land was double disked and about 50 per cent. of the grub were injured. The pest looks to me as serious to mealie cultivation as cut-worm and stalk-worm combined."

In another letter, dated the 8th November, Mr. Lilienthal wrote:—

"On the 2nd inst. I sent you some grub of *Heteronychus arator* from a field where the beetle made its first appearance; which field was not cropped last season.

"This day I had some land ploughed, in which the mealies were partly destroyed by the beetle last year, divided from above field by a 20 feet road only. Naturally I was surprised to see neither beetle nor pupa; but on closer observation I discovered the cockchafer grub enclosed. Judging from its size and the locality from which it was taken, I believe it is the very thing you want. Further, I have found only one grub of this shape and larger, mostly prevalent in old manure kraals, but this grub was here before the advent of above beetles. I had a quantity of grub, but they had mashed one another, so I deem it safe to send one only.

"Having passed my opinion on the possible eradication, I stated winter-ploughing, but having written rather in a hurry, I omitted to state that apart from killing the beetle in its different stages of development in stirring the soil, the principal effect would be starving the insect through keeping down all vegetation till planting time. However, if any pasture should be adjoining, without doubt some beetles will always enter the cultivated area."

One of the buoyant factors in the cattle market, says the *Rural Californian* (Los Angeles), is the high price of hides. The demand for leather is so strong that the slaughter of cattle is not sufficient to keep up with it.

The value of ploughing matches is evident, says the *Agricultural Gazette* (London). They bring farmers and their men closer together in friendly rivalry in a contest where each is striving to outdo his neighbour in one of his most important farming operations. They discuss the merits of good ploughing and compare the good work with the poor. It is safe to say that the man who takes part in a ploughing match will be a better farmer thereafter, and will take more interest in his work, even if he does not win a prize.

Landbouw Wetten—Zitting, 1907.

Onderstaande zijn de voornaamste voorzieningen van de Wetten betrekkelijk landbouw door het Parlement aangenomen gedurende de pas geeindigde Sessie:—

AKTE No. 6, 1907.

"Om voorziening te maken voor de verplichtende omheining van gronden binnen de Kolonie Natal."

2. (*a*) Met het doel om de verspreiding van de veeziekte bekend als de Oost Kust Koorts te voorkomen, en niettegenstaande eenig iets vervat in de Omheinings Wet, 1887, of de Wetten en Akten dezelve amendeerende, kan de Minister van Landbouw, met de goedkeuring van den Gouverneur in Rade heiningen laten oprichten langs de lijnen van eenige plaatsen binnen een besmet of verdacht area of van eenige inboorlingen locatie of van eenige dorpsgronden binnen zoodanig terrein. (*b*) Het woord "omheining" in deze Akte zal beteekenen eene heining goedgekeurd door den Minister van Landbouw.

3. (1) De kosten van de oprichting van eenige heining langs de grenslijnen van eenige plaats zullen in de eerste instantie betaald worden uit gelden door Parlement gestemd. Zoodanige kosten zullen terugbetaald worden, tezamen met de interessen daarop tegen de koers van vijf per centum per jaar, door dertien jaarlijksche paaiementen, het eerste betaalbaar twee jaren na de omheining voltooid is. Zoodanige paaiementen zullen berekend en vastgesteld worden zoo dat de gezegde kosten met interessen daarop ten volle terugbetaald zullen zijn binnen een tijdperk van dertien jaren van af den datum waarop het eerste paaiement schuldig wordt. (2) Zoodanige terugbetalingen van de kosten en interessen zullen gemaakt worden door den eigenaar van eenige plaats omheind onder de laatst voorafgaande sectie of als de heining de plaatsen van aanliggende eigenaars scheidt dan zal elk zoodanig eigenaar een helft belaten van de kosten van het gedeelte der heining zoodanige plaatsen scheidende tezamen met de interessen voormeld. (3) Het woord "eigenaar" in deze en de volgende secties zal beteekenen den persoon geregistreerd als de eigenaar op het kantoor van den Registrateur van Akten en het woord "plaats" zal eenig gedeelte van eene plaats inbegrijpen. (4) Als eenige plaats of area begrensd is door eenigen rivier-oever, donga of spruit, zal de Minister van Landbouw de macht hebben de heining op te richten langs een of ander meer gelegen lijn. In zoodanig geval zullen de kosten van de heining uitsluitelijk door het Gouvernement gedragen worden dat het recht zal hebben dezelve van de hand te zetten of te verwijderen wanneer wenschelijk. (5) Waar het aangrenzende land Kroon grond is of ge-

houden wordt door de Natal Native Trust zal het Gouvernement of de Natal Native Trust, zoo het geval eischt, eene helft van de kosten der heining dragen.

4. De Minister van Landbouw zal den Registrateur van Akten in geschrifte bekend maken met het bedrag verschuldigd door eenigen eigenaar onder deze Akte, en de Registrateur van Akten zal op ontvangst van zoodanige bekendmaking het gezegde bedrag aanteekenen in het Land Register en zal aan den Minister van Landbouw een certificaat leveren uiteenzettende zoodanig bedrag en den datum der aanteekening. De kosten van zoodanige heining zullen een eerste vordering en verband ten gunste van het Gouvernement op het land alzoo omheind zijn, en zoodanig verband zal voorkeur hebben over eenig bestaand verband daarop. Een aanteekening zal door den Registrateur van Akten gemaakt worden in het Publieke Schuld Register van de bijzonderheden van zoodanige schuld verschuldigd aan het Gouvernement, en van het verband op den grond.

5. Wanneer eenige zoodanige plaats voormeld gehouden onder huurcontract omheind is door eene heining opgericht onder deze Akte gedurende den loop van de huur, zullen de verhuurders gerechtigd zijn te ontvangen van den huurder van af den datum wanneer zoodanige plaats alzoo omsloten werd eene betaling van vijf per centum per jaar op eenige som die hij aan den Minister van Landbouw betaald mag hebben onder Sectie 3, en zoodanige betaling zal geschieden tezamen met de huurgelden der plaats en zal beschouwd worden naar rechten deel te zijn van zoodanige huur.

6. Wanneer de Minister van Landbouw ook eenige kosten gemaakt zal hebben ten opzichte van de omheining onder deze Akte ten opzichte van eenige dorpsgronden die het eigendom geworden zijn van de Corporatie van eenige Municipaliteit of het Plaatselijk Bestuur van eenig Dorpgebied, zullen de kosten terugbetaalbaar zijn door zoodanige Corporatie of Plaatselijk Bestuur op wijze voorschreven door subsectie 1 van Sectie 3 van deze Akte.

7. Niets in de voorgaande secties zal beschouwd worden eenigen persoon verantwoordelijk voor de kosten van de oprichting eener heining onder deze Akte te beletten gekeurde materialen of dienst of transport bij te dragen tot de kosten van zoodanige heining en eenige zoodanige bijdrage zal afgetrokken worden van de bedragen vermeld in de gezegde secties respectievelijk volgens eene waarde te worden bepaald bij gebrek van een overeenkomst door den Magistraat van het District.

8. De Minister van Landbouw kan laten omheinen:—(1) Eenige paden hetzij publiek of privaat eenig deel der Kolonie doorloopende; (2) Eenige grenzen der Kolonie of uitspanplek in de Kolonie; en de kosten van eenige omheining opgericht onder de machten dezer sectie kunnen geheel bestreden worden uit de gelden gestemd door Parlement voor de doeleinden van deze Akte,

9. Deze Akte zal gelezen en uitgelegd worden in verband met de voorzieningen der Omheinings Wet van 1887 en de amendeerende Akten voor zoo ver dezelve toepasselijk daarop zijn; en de Minister van Landbouw zal de macht hebben eigenaars te gelasten eenige heiningen behoorlijk te onderhouden en in goede reparatie te houden; en, wanneer zij in gebreke blijven, kan hij zoodanige reparatie ten uitvoer brengen op kosten van den eigenaar, onderworpen aan de voorzieningen van sectie 3 van deze Akte. Geen persoon zal verwijderen of op eenige wijze zich bemoeien met eenige heining opgericht of onderhouden onder authoriteit van deze Akte.

10. De Gouverneur in Rade kan van tijd tot tijd regulaties maken, en eenig persoon overtredende zoodanige regulaties zal, bij overtuiging in het Hof van een Magistraat, onderhevig zijn aan eene boete niet te boven gaande Tien Pond (£10) of bij wanbetaling tot gevangenisstraf met of zonder harde arbeid voor een tijdruimte niet te boven gaande eene maand.

11. Eenig persoon die Sectie 9 van deze Akte overtreedt zal, bij overtuiging in het Hof van een Magistraat, onderhevig zijn aan eene boete niet te boven gaande Vijf en Twintig Pond (£25), of tot gevangenis met of zonder harde arbeid voor eenige tijdruimte niet te bovengaande zes maanden.

AKTE No. 7, 1907.

"Om te amendeeren Akte No. 53, 1906, getiteld 'om den Gouverneur te machtigen de somma van £100,000 van de Geconsolideerde Leenings Fondsen te leenen te worden aangewend tot het voorkomen of onderdrukken van de ziekte bekend als Oost Kust Koorts.'"

1. Sectie 3 van Akte No. 53, 1906, wordt hiermede herroepen en de volgende daar in de plaats voor gesteld:—

De doelenden waarop deze Akte toepasselijk is zijn als volgt:

(1) Leeningen aan vee eigenaars of anderen die zoodanige hulp behoeven om hunne gronden te omheinen, om transport dieren aan te koopen of anderszins tot het voorkomen of de onderdrukking der ziekte bekend als Oost Kust Koorts;

(2) De aankoop door het Gouvernement van zoodanige ezels, muilen, paarden, wagens of trekgoed als noodig mogen zijn tot het daarstellen van een transport dienst in eenig district waarin de beweging van ossen belet moge worden onder de voorzieningen van de Oost Kust Koorts Akte No. 32, 1903, en alle amendeerende Akten thans van kracht en eenige regulaties daaronder gemaakt.

AKTE No. 8, 1907.

"Om te amendeeren Akte No. 32, 1903, getiteld Akte 'Om de verspreiding van de Ziekte bekend als Rhodesische Rooiwater te verhinderen.'"

1. De volgende clausule zal toegevoegd worden tot Akte No. 32, 1903:

> De Minister kan ten eenigen tijd wanneer hij het noodig beschouwt zulks te doen ten einde de verspreiding der ziekte te voorkomen, gelasten de verwijdering van vee van een besmet terrein of van eenige plek aan een besmet terrein liggende, en ze van de hand zetten voor onmiddellijke slachting: Mits, echter, dat de eigenaar van eenig zoodanig vee de keus zal hebben om alle dezelve door private overeenkomst, voor slachten, van de hand te zetten binnen eene week na hem schriftelijke kennis is gegeven. Als de eigenaar zoodanig vee alzoo van de hand zet moet hij voldoen aan al de Gouvernements vereischten, en aan alle regels en regulaties welke van kracht mogen zijn betrekkelijk de verwijdering van vee. Voor vee alzoo genomen zal betaald worden tegen de prijzen uiteengezet in de Schedule tot deze Akte.

2. De Schedule tot Akte No. 54 van 1906 wordt hiermede herroepen, en de volgende Schedule vastgesteld in plaats daarvan, namelijk:—

SCHEDULE.	£	s.	d.
Jaar oud ossen of bullen, tot	2	0	0
Jaar oud vaarzen, tot	3	0	0
2 jaar oud ossen of bullen, tot	3	0	0
2 jaar oud vaarzen, tot	4	0	0
3 jaar oud ossen of bullen, tot	4	0	0
3 jaar oud vaarzen, tot	5	0	0
Koeien, 4-8 jaren, met kalvers, tot	7	10	0
Koeien, 4-8 jaren, zonder kalvers, tot	6	10	0
Ossen, over 4 jaren, tot	7	0	0
Koeien, 8-12 jaren, met kalvers, tot	6	0	0
Koeien, 8-12 jaren, zonder kalvers, tot	5	0	0
Oude koeien, met kalvers, tot	4	0	0
Oude koeien, zonder kalvers, tot	3	0	0
Bullen, 4 jaren en ouder, tot	4	0	0

AKTE No. 14, 1907.

"Om te amendeeren Akte No. 27, 1899, getiteld 'Akte om voorziening te maken voor de inspectie en het onderzoeken van vee in deze Kolonie aankomende over zee, en om den invoer der ziekte tuberculose te voorkomen.'"

1. Deze Akte zal gelezen en uitgelegd worden samen met Akte No. 27, 1899, hierinna genoemd de principale Akte.

2. De woorden "of land" zullen ingelascht worden na de woorden "over zee" in de tweede sectie der principale Akte.

3. Secties 4, 5, en 6 van de principale Akte worden hiermede herroepen, en de volgende daarvoor in de plaats gesteld:—

> Alle vee Natal binnen gebracht over zee uitgenomen die vergezeld van certificaten gegeven door bevoegde Veeartsenijkundige Ambtenaren door den Minister van Landbouw goedgekeurd, zal op aankomst in kwarantaine gesteld worden tot zij getoetst zijn door den Onderzoeker met tuberculin, en zullen niet ontslagen worden uit zoodanige kwarantaine voor dat de Onderzoeker ze certificeert vrij te zijn van eenige reactie die aantoont dat zij besmet zijn met tuberculose in den vorm van de Schedule tot deze Akte.
>
> Vee Natal binnen gebracht over eenig binnenlandsch grens, kan, naar discretie van den Minister van Landbouw, vereischt worden in kwarantaine geplaatst te worden bij de ingangsplek, of op aankomst ter hunner bestemde plaats, en aldaar te worden getoetst met tuberculin door een ambtenaar van het Veearts Departement, en het vee zal niet uit zoodanige kwarantaine ontslagen worden voor dat zij gecertificeerd worden door zoodanigen ambtenaar vrij te zijn van eenige reactie die aantoont dat zij besmet zijn met tuberculose in den vorm van de schedule tot deze Akte.

4. Sectie 7 van de principale Akte wordt hiermede herroepen, en de volgende daarvoor in de plaats gesteld:—

> In geval eenig zoodanig dier blijkt besmet te zijn met de ziekte tuberculose zal het niet levend verwijderd worden van het kwarantaine station maar zal aldaar afgemaakt worden: Mits dat de eigenaar in gevallen van dieren ingevoerd over zee de keuze mag hebben het dier terug te zenden of wederom ter scheep te brengen, in welk geval het derect van het kwarantaine station naar het vaartuig genomen zal worden.

5. De woorden "of land" zullen ingelascht worden na de woorden "over zee" in Sectie 12 van de principale Akte.

6. Eenig vee dat toegelaten werd te landen onder de 13de Sectie der principale Akte zal geinspecteerd en gebrandmerkt worden met een geschikt brandmerk voorgeschreven door den Principalen Veearts, en zij zullen geslacht worden binnen een tijdruimte van een kalender maand van af den datum der landing in de Kolonie.

In geval van vee alzoo ingvoerd komende uit Landen waar tuberculose bekend is te bestaan zal zoodanig vee gekwarantaind worden tot zij geslacht worden en hunne karkassen of eenig gedeelte daarvan zullen niet verwijderd worden totdat zij gekeurd zijn, als geschikt voor menschelijk voedsel, door een Gouvernements Veearts, Indien eenig zoodanig vee niet geslacht wordt binnen eene maand, of binnen zoodanig langer tijdperk als toegestaan moge worden door den Principalen Veearts, zal de eigenaar onderhevig zijn ten opzichte van elk dier aan eene straf als voorgeschreven in Sectie 12 van de principale Akte.

AKTE No. 15, 1907.

"Om de Akte op het voorkomen van Longziekte, 1897, te amendeeren."

1. Het woord "eigenaar" als gebruikt in de Longziekte Voorkomings Wet van 1897 (hierinna genoemd de principale Akte) zal insluiten een vennootschap, maatschappij of Corporatie.

2. Het woord "longziekte" zal beteekenen de ziekte bekend als besmettelijke *pleuro-pneumonia* in dieren van de os soort.

Sectie 3 van de principale Akte wordt dienovereenkomstig geamendeerd.

3. De benoeming van vee inspecteurs zal door den Minister van Landbouw gemaakt worden en niet door den Gouverneur in Rade of door den Gouverneur, als voorzien onder secties 5 en 6 van de principale Akte.

4. Sectie 8 van de principale Akte wordt hiermede herroepen, en de volgende wordt in de plaats daarvan vastgesteld:

> In geval eenige troep verklaard wordt door een Gouvernements Veearts of zoodanigen Inspecteur besmet te zijn met de ziekte van longziekte, zal den eigenaar van zoodanige troep eene licentie vergund worden, overeenstemmende zoo na mogelijk met den vorm der licentie voorgeschreven in Schedule B, om zoodanig vee voor een tijdperk van drie manden te houden ten einde de troep te zuchten of in te enten en met eens af te maken eenig dier dat een Gouvernements Veearts of Inspecteur verklaart de kenteekenen van longziekte te toonen. Elk zoodanige licentie zal eene conditie bevatten dat het vee daarmede gelicentieerd zal, naar keuze van den eigenaar, meteens gezucht of ingeent worden tot voldoening van den Inspecteur, en dat alle dieren toonende teekenen der ziekte dadelijk afgemaakt zullen worden. Wanneer zoodanige licentie verloopen is zal de Gouvernements Veearts of Inspecteur zoodanige troep weer inspecteeren en, mocht er een geval van longziekte in zoodanige troep geweest zijn binnen het tijdperk der licentie, zal de licentie hernieuwd worden voor een verder tijdperk van drie maanden van af den datum van het laatste voorval, en zoodanige inspectie zal hernieuwd worden elk drie maanden totdat zoodanige troep vrij van de ziekte gevonden wordt. Geen vee zal toegelaten worden verwijderd te worden van het land waarop zij gelicentieerd zijn totdat de Gouvernements Veearts of Inspecteur de troep schoon zal verklaren, onder straffe

van hoogstens Vijf-en-twintig Ponden sterling, of bij wanbetaling daarvan, aan gevangenisstraf van hoogstens drie maanden.

5. De kennis vereischt te worden gegeven door den eigenaar onder Sectie 9 van de principale Akte zal aan den Districts Veearts of den Inspecteur zijn, en niet aan den Magistraat als voorzien onder de gezegde sectie.

6. In geval een dier afgemaakt wordt op order van een Gouvernements Veearts of Inspecteur onder de voorzieningen van Sectie 4 dezer Akte, zal compensatie aan den eigenaar van zoodanig dier betaald worden tegen de prijzen uiteen gezet in de Schedule A van deze Akte; Mits dat in het geval dat de eigenaar schuldig is aan eenige nalatigheid door in gebreke te blijven om te rapporteeren of door eenig onbehoorlijk verzuim in het rapporteeren van eene uitbreking, dan zal geen zoodanige compensatie betaalbaar zijn.

7. Sectie 10 van de principale Akte wordt hiermede herroepen, en de volgende wordt in de plaats daarvan vastgesteld:—

> Alle vee alzoo gelicentieerd zullen afgezonderd worden door ze op te passen, of anderszins, op eene distantie van niet minder dan tien yards van de lijn van het eigendom waarop zij gelicentieerd zijn, en van eenig publiek pad.
>
> Voor elke overtreding van deze voorziening zal de eigenaar onderhevig zijn, bij overtuiging in het hof van een Magistraat, tot eene boete van hoogstens Dertig Ponden Sterling of, in gebreke van betaling, tot gevangenisstraf met of zonder harde arbeid voor eenig tijdperk niet te bovengaande zes maanden:
>
> Mits dat als het bewezen wordt tot voldoening van den Gouvernements Veearts of Inspecteur, in het geval waar een plaats doorsneden wordt van een publiek pad of paden, dat het absoluut noodig is voor gelicentieerde vee om over of langs zoodanig pad of paden te gaan of te worden gedreven de Inspecteur gemachtigd is zoodanige verwijdering toe te laten onder de beperkingen vervat in Sectie 13 van de principale Akte.

8. Schedule B van de principale Akte wordt hiermede herroepen en de volgende wordt in de plaats daarvan vastgesteld:—

SCHEDULE B.

Ik certificeer dat een troep van (noem aantal)............stuks vee behoorende aan........op de plaats........in Wijk........County van..........besmet is met longziekte, en ik verleen hiermede aan de gezegde........licentie dezelve voor drie maanden van af datum te houden met het doel om te voldoen aan de condities van Secties 8, 9 en 10 van Akte No. 30, 1897, als geamendeerd door Akte No. 15, 1907, als hierop geendosseerd.

Gedateerd te......dezen......dag van......19....

....

SCHEDULE A.

	£	s.	d.
Jaar oud ossen, tot	2	0	0
Jaar oud vaarzen, tot	3	0	0
2 jaar oud ossen, tot	3	0	0
2 jaar oud vaarzen, tot	4	0	0
3 jaar oud ossen, tot	4	0	0
3 jar oud vaarzen, tot	5	0	0
Koeien, 4-8 jaren, met kalveren, tot	7	10	0
Koeien, 4-8 jaren, zonder kalveren, tot	6	10	0
Ossen over 4 jaren oud, tot	7	0	0
Koeien, 8-12 jaren oud, met kalveren, tot	6	0	0
Oude Koeien, met kalveren, tot	5	0	0
Oude Koeien, zonder kalveren, tot	4	0	0
Bullen, onder 4 jaren, tot	3	0	0
Bullen, over 4 jaren, tot	4	0	0

AKTE No. 28, 1907.

"Om te amendeeren Akte No. 44, 1904, betiteld Akte, 'om de landbouw ontginning van Natal te ondersteunen en bevorderen.'"

1. Sectie 12 van de Landbouw Ontginnings Akte No. 44, 1904, hierinna genoemd de principale Akte, wordt hiermede herroepen.

2. De volgende clausule zal bij Sectie 34 van de principale Akte gevoegd worden:—

> Een "allottee" zal gerechtigd zijn, wanneer hij de Commissie voldoende toont dat hij het perceel in zijn bezit voordeelig geoccupeerd heeft voor een tijdperk van vijftien aaneenvolgende jaren, tot een vergunning als vrij eigendom van het perceel alzoo geoccupeerd, op zoodanige voorwaarden omtrent de betaling van de koopsom als de Gouverneur in Rade toe mag besluiten op advies van de Land Commissie.

3. De volgende clausule zal bij Sectie 36 van de principale Akte gevoegd worden:—

> De "allottee" zal gerechtigd zijn, wanneer hij de Commissie voldoende toont dat hij het perceel in zijn bezit voordeelig geoccupeerd heeft voor een tijdperk van vijftien aaneenvolgende jaren, tot een vergunning als vrij eigendom van het perceel alzoo geoccupeerd, op zoodanige voorwaarden omtrent de betaling als de Gouverneur in Rade toe mag besluiten op advies van de Land Commissie.

AKTE No. 29, 1907.

"Om den uitvoer van Struisvogels en Struisvogel eiers te verbieden."

2. Het zal niet wettig zijn eenigen Struisvogel of eenig Struisvogel ei uit te voeren, tenzij als hierinna voorzien, naar eenige plek buiten de

limieten dezer Kolonie, of naar eenig land daarvan door de zee gescheiden: Mits echter dat deze verbieding niet toepasselijk zal zijn op den uitvoer van eenigen Struisvogel of eenig Struisvogel ei naar eenige naburige Kolonie of Staat die, door haar of zijn eigen Wetgeving, gelijkerwijs den uitvoer van Struisvogels en Struisvogel eiers zal hebben verboden, onderworpen aan de voormelde vrijstelling, naar eenige naburige Kolonie of Staat, en op een straf niet minder dan die voorzien door deze Akte. En mits verder dat niets in deze Akte den uitvoer zal beletten van de doppen van Struisvogel eiers waarvan de inhoud verwijderd is, of van Struisvogel eiers die onvruchtbaar zijn gemaakt, mits dat in laatstgenoemd geval een permit om uit te voeren verkregen zal zijn van den ambtenaar door het Gouvernement voor dat doel benoemd.

3. Ieder persoon die de voorzieningen dezer Akte overtreedt door eenigen Struisvogel of Struisvogel ei uit te voeren (behalve als hierintevoren uitgezonderd) zal bij overtuiging onderhevig zijn aan gevangenisstraf met of zonder harden arbeid voor eenig tijdperk van niet minder dan twaalf maanden noch meer dan twee jaren.

4. Alle straffen onder deze Akte kunnen gehandhaafd worden in het Hof van den Magistraat der Afdeeling waarin de overtreding bedreven werd.

NITROGEN AS A FRESH-FRUIT PRESERVATIVE.—A new method of preserving fruit during shipment has been elaborated by Mr. Elward Cooper, State Horticultural Commissioner of California. At the Paris Exposition of 1900 there was exhibited a number of fish that had been preserved in nitrogen for seven years without decay; and, hearing of this, Mr. Cooper began to consider the possibility of supplying a suitable container at a low cost for the purpose of preserving Californian fruit during shipment to eastern markets. After much experimenting he has now succeeded in producing such a container. The container is a paper box treated with bitumen to prevent the entrance of oxygen from the outside atmosphere. After the box has been filled with fruit it is closed except for a small opening. A number of these boxes are placed in a steel cylinder from which the air is exhausted. The cylinder is then filled with pure nitrogen gas, and by means of an automatic device the boxes are sealed. The boxes are of a size to fit the wooden cases or crates in which fruit is ordinarily shipped. Mr. Cooper has packed pears, grapes, cherries, etc., in nitrogen, and taken them from the containers after five months in perfect condition. Fruit that was not in good condition when packed showed, when removed from the containers, that decay was arrested as soon as the oxygen was excluded.

INDIAN OATS AT THE WEENEN EXPERIMENT STATION.
Grown under Irrigation.

Alfred County Farmers' Association.

ANNUAL PRESIDENTIAL REPORT.

On Saturday, 26th October, the Alfred County Farmers' Association held their annual general meeting, in the Public Hall at Harding, when the President (Mr. A. G. Prentice, J.P.)) read his annual report, as follows:—

"In presenting to you the third report of your Society, I have to congratulate the committee and members on the very successful show held in June last. At the commencement of the season it was thought that, owing to the presence of East Coast Fever in the Colony, the show would be a very poor one, and that cattle, at least, would have to be excluded from the prize list, but the very courteous and wise action of the present Minister of Agriculture, in adopting the suggestion of joining hands with the Cape in closing the Umzimkulu River to the ingress of cattle, enabled us to exhibit in this section as usual. The horses shown were more numerous this year, and the quality, with one or two exceptions, was excellent. The same may be said of the cattle, which were in far better condition than last year. Sheep, however, were not well represented, all the exhibits of woolled sheep belonging to one man. Considering that the wool grown in this district has for many years realised the highest price in Natal, I think that it is a pity there is not more competition in this section, and I hope to see all the pens filled at the next show. This display of agricultural and home produce in the new hall, which is the largest covered-in space on this side of Maritzburg, was most gratifying, and in this section we are far ahead of the Kokstad and Ixopo shows.

"At the half-yearly general meeting it was decided to build a produce hall, the money to be raised by debentures of £5 each, bearing interest at 6 per cent. Your committee accepted the tender of Mr. Field to erect a wood and iron building 80ft. by 25ft. for the sum of £247 16s. 6d., this, together with insurance and a few other expenses for fittings, etc., making a total of £266 4s. 9d. Debentures to the amount of £160 have been taken up, leaving a debit of £106 4s. 9d. I trust that the remaining twenty-one debentures will be taken up at this meeting, as it is necessary that the debt should be cleared off.

"I am sure that you all followed with keen interest the debate in the Legislative Assembly with regard to

Our Railway,

and I have no doubt that many of the statements made by Members in that House, and particularly the one that no definite promise had been given that the line should be built, came as an unpleasant surprise to you, as it did to me. I have no wish to discuss this matter here in this report, leaving it rather with you to decide as to what action is to be taken in the future, but I would most strongly urge upon the farmers of this county the necessity, while waiting for the completion of the line, to develop the resources of the country, and so hasten its arrival. You have in this district a great source of wealth. I allude, gentlemen, to the

WATTLE INDUSTRY.

We have the assurance of Mr. Sim, the Conservator of Forests, and the Minister of Agriculture, that the red or chocolate-coloured soil of this Division is equal, if not superior, to the very best land in Umvoti County, and these statements are borne out, not only by the rapid growth of the trees, but also by the high price paid for the bark, so that, if every farmer would only plant a certain quantity of wattles—even if it were only in some cases to fill up odd corners of the farm—we should in a very short time compel the building of a line here.

"While on the subject of bark production, I would point out to would-be growers that wattles in this district will (if given thorough attention and thinned out when small to 6ft. apart) grow 10ft. in height in twelve months from the day of planting, and as much as £35 to £40 cash be taken from one acre when matured. Yet these advantages will be thrown away unless the bark is placed on the market in a perfectly sound condition. I appeal to all growers to try and do everything in their power to retain the splendid reputation this county at present enjoys for its bark.

"Your thanks are specially due to the Minister of Agriculture, not only for his far-seeing policy as regard this unfortunately situated portion of the Colony, but also for his unfailing readiness to give help where practicable. I sincerely thank the committee, and especially the secretary and treasurer, Mr. H. C. Hitchins, for their valuable assistance during the past year."

People do not know, says the *Rural New-Yorker,* that drain tile is now made of concrete. In some sections where there is little or no clay, sand and cement are used to make tile, which are said to be superior in some ways to baked clay. The tiles are made in moulds, by hand, or in a machine which will turn out about 300 an hour.

Inanda Agricultural Association.

ANNUAL PRESIDENTIAL ADDRESS.

On the 23rd October the Inanda Agricultural Association held their annual meeting at Verulam, when the following report of the President of the Association (Mr. W. J. Thompson) was read and adopted:—

For the second time, as President of this Association, it is my privilege to present to you a report of the events during the past year.

Depression.

When presenting my last report we hoped for a revival of trade, but unfortunately our expectations have not been realised. We can only hope the coming year will be one of greater prosperity to agriculture and commerce, that the dark cloud of depression over South Africa will have passed away. I place agriculture and commerce together, as one without the other cannot possibly be prosperous, and any attempt to divide the two means disaster. There is no doubt the commercial community is suffering intensely through this depression, probably more than the agriculturist; their hope is that the agriculturist will follow the advice given by our present Prime Minister to produce more. If the farmers' spending power is limited, it is bound to affect commerce. Unfortunately, the spending power is limited through the many drawbacks the farmer and planter have to contend with. Notwithstanding the great losses, let us face the difficulty and do out utmost to produce more out of the soil.

Sugar Industry.

This industry is still hampered and retarded in its progress by oversea imports, and the reduction of protection from £5 to £3 10s. per ton on refined sugars. Australia will have a surplus of about 30,000 tons of sugar this year, and with the object of keeping up the price for the quantity used in that country, it is the intention of the two largest refining companies to send over here the greater portion of this surplus, the two companies standing between them any loss which may be sustained. This lowering of the duty on refined sugars means thousands of pounds loss to planters to support a Java product refined in Australia free of duty into that country, and also supported by a bounty. How is it possible to cope with such unfair competition? The duty should be re-imposed, otherwise young men who have leased land in the province of Zululand will have a difficulty in making the industry pay. The imports of sugar from January 1st to September 30th this year amounted to about 20 million pounds weight (10,000 tons). This huge importation is the direct result of the unfair competition referred to. Natal sugar exported during the same period amounted to 4,589 tons.

AGRICULTURAL BANK.

The Government are to be complimented on bringing forward such a useful institution. It will be a strong helping hand, and will greatly assist in putting agriculture on a proper footing. An agricultural bank is the first necessity, and if managed efficiently will prove a great boon to the Colony.

LAND QUESTION.

Since my last report, the Legislature has made it optional with regard to the tenure of lands in the Province of Zululand, which can now be purchased in freehold. With regard to leasing, the objection, in my opinion, is to a great extent a matter of sentiment. One of the arguments was that it would be difficult to raise money on leasehold tenure, but the agricultural bank will now make this possible. The greatest objection to purchase will be the admission of land speculators. At the present time, as we are all well aware, the existence of the land speculator is one of the greatest drawbacks to the general welfare of agriculture, and I very much regret that the policy of leasehold tenure, which was apparently working well, has been altered. If the Colony were under a land improvement law, and the landowner compelled to show an improvement of his holding, there would not be so much idle occupation, and consequently not the same risk of Zululand being made the subject of speculation.

MEALIES.

Again, the Government are to be complimented in obtaining such favourable terms with the shipping companies with regard to freights for this export trade. There is a possibility for a regular outlet for our surplus stocks of mealies: London, Hamburg, and Australia are, I believe, open to take any quantity, but they must be of the very best quality to ensure a fair price, and, most important of all, must be properly graded. All grain is sold from sample, and nothing tells so much against it in big markets as mixed quality. There was a very important suggestion made by a member of the Government, when he pointed out that the mealies should be placed in new bags, as a clean new-looking sack shows the contents to so much better advantage. We know the quality of Natal mealies cannot be equalled, and with careful selection of seed and cultivation we shall be able to maintain this position. It may be three or four years before we get the full benefit of exporting, but, in my opinion, there is a great future for this industry. Our exports from January 1st to September 30th amounted to 176,130 muids. There is no doubt there was a shortage in the mealie crop; last summer was exceptionally wet, and the damage caused by locusts brought the crop much below the estimate.

FRUIT.

We all had great hopes that the fruit export trade would materially assist in bringing a return of prosperity to the Colony, but unless some radical change occurs in the returns obtained by growers here, there is not likely to be much more done in this direction. I give below the figures relating to ten shipments of naartjes from a farm in this Division, which are very discouraging, and would seem to indicate very excessive charges after arrival Home, seeing that we were led to believe that very fair prices were realised on the whole for Natal fruit.

The figures are as follows:—Received for 70,000 selected naartjes, £71 4s. 9d. Against this had to be charged: 70,000 wrapping papers at 2s. 9d. per 1,000, £9 12s. 6d.; 700 boxes at 6½d. each, £18 19s. 2d.; labour for picking and packing (reckoned at 1s. 4d. per day), £28; transport and N.G.R., £3; total, £59 11s. 8d.; leaving a balance of £11 13s. 1d., which works out at 4d per 100, a very disappointing result surely. Unfortunately, this is not an isolated case, but I understand that better results have been achieved from some consignments sent Home privately, and possibly from the experience gained this year more economical means may be adopted for placing the fruit on the Home market.

TEA.

This industry is steadily progressing, the tea improving both in quality and quantity manufactured. Several shipments sent to London have realised satisfactory prices.

WATTLE BARK.

A start on a fairly large scale has already been made in growing wattles in this Division, and I am informed that the Natal Estates, Ltd., also contemplate planting a considerable acreage.

FIBRE.

This is a new industry, from which very good results may be anticipated if it is taken up by planters. Fibre can be grown on lands which are quite unsuitable for other Coast products, and as the machinery for treating the leaf is, comparatively speaking, inexpensive, it would seem to promise well for the small farmer as well as for the larger estate owners. Mr. Leonard Acutt, who recently went to Mauritius for the purpose, has written a report on the industry, which I expect will appear in the *Agricultural Journal.* The Dalmeny Fibre Co., at Duff's Road, contemplate planting 600 acres at the rate of 200 acres a year for the next three years, planting at the present time being in full swing.

TOBACCO.

838,534 ℔. of tobacco was exported during the nine months ended September 30th. There is to be an open competition for Colonial leaf tobacco held in London in March next year, at which it is to be hoped all our local growers will compete. Samples of not less than 4 ℔. weight should be sent, carriage paid, to reach London not later than March 15th, 1908, addressed to the Manager, Tobacco International Exhibition, 2, Monument Station Buildings, London. The manager of the exhibition will pay the duty and the samples will become his property afterwards, unless otherwise arranged. This should be a good opportunity to bring Natal tobacco before the Home purchasers, with benefit to the growers and the Colony generally.

EXPERIMENT FARM.

This farm at Stanger continues to do good work, as was proved by the annual report recently issued. Too much praise cannot be given to Mr. Addison for his untiring efforts in connection with this work. Members of this Association paid a visit to the farm a short time ago, and were well entertained by the managing committee. Everyone was pleased with the results shown, and many notes were made by planters present, which will no doubt prove of value when applied to their own work.

TICK FEVER.

The hope expressed by me last year that we might escape this terrible disease in this district has, unfortunately, not been realised. Owing to the strenuous efforts of the District Veterinary Surgeon, Mr. J. McNeil, and our hard-working Stock Inspector, Mr. J. Swales, the disease has not yet made its appearance in this division south of the Umhloti River, but in other parts of the Colony its ravages have been most severe, and, without question, this has had a very great share in preventing that return to prosperity which we are so anxiously awaiting. In consequence of representations made by this Association, that part of the Inanda Division between the Umgeni and Umhloti Rivers has been divided into zones in which cattle may move under permit, and this has relieved the situation to a great extent. The thanks of the Association are due to Messrs. T. Polkinghorne and W. W. Sykes for so ably representing us in the deputation to Government to obtain this concession. Much to our regret, Government found it necessary to dispense with the services of Mr. McNeil, the District Veterinary Surgeon. I would like to place on record the high opinion held of him by all stock owners in his district, and trust he may succeed in Durban, where he has started private practice. On behalf of the Association, I extend a welcome to his successor, Mr. Bruce, who has taken over the duties for this district.

LOCUSTS.

This scourge is again with us, and I fear to a greater extent than last year. Several swarms have already laid their eggs—quite a month earlier than has been their habit hitherto. Our only hope is for the whole of

South Africa to make a combined effort for their destruction. This is, of course, an enormous task, but it will have to be successfully tackled before agriculturists will have any feeling of security that they will reap what they have sown. In one district of the Transvaal alone, the loss caused by this pest was estimated at £219,000 during only one season.

Agricultural Union.

We have been ably represented at the meetings of the Union by Messrs. C. Bishop and T. Polkinghorne. Mr. W. A. Campbell was elected a delegate, but was, unfortunately, prevented from attending by illness.

New Members.

Seven new members have joined the Association during the past year, and I would repeat the invitation given in my last report to residents in the Division to join us, and so add to our strength in considering the many questions that are dealt with by the Association.

Roads.

The condition of the roads in the Inanda Division was dealt with by the Association, with generally satisfactory results, Mr. Head and Mr. Ralfe having been always willing to accede to our requests so far as lay in their power.

List of Property-Owners.

The Association asked the Government to supply each Fieldcornet with a list of property-owners in their respective divisions, so as to enable them to compile a more complete voter's roll. Owing to financial considerations, Government could not comply with the request, but promised to consider the matter when circumstances allowed. I consider that the money this would cost would be well spent in the interests of the Colony, as under the present system the voter's roll is compiled in a more or less haphazard manner.

Agricultural Shows.

Owing to the continued depressed state of affairs generally, it was decided not to hold a show this year. I hope next year will allow of an effort being made to organise one, as such an event always causes a lot of friendly rivalry, which is bound to have a good effect on everyone concerned.

Crop Statistics.

The Association has to thank Messrs. T. Polkinghorne, J. Swales, R. Armstrong, and A. J. Harvey for obtaining statistics of estimated crop returns, in response to a request from the Minister of Agriculture.

"Agricultural Journal."

I would remind members of the low subscription at which this useful periodical is to be obtained, namely, 5s. per annum. Much valuable information is always to be obtained from it, and Government should be supported in their efforts to keep the agricultural community so well posted in matters concerning them.

IN CONCLUSION,

I would like to give a word of warning in regard to the danger it seems to me we are all in of being too downhearted as to our future prospects. It has been the history of the world that immediately after a war there is a period of unnatural inflation, followed by a corresponding period of depression. We are now suffering from the latter, but history again teaches us that a recovery always follows, and generally the country emerges wiser for the set-back. We know full well that we in Natal suffered from swelled head to an extraordinary degree; we took the fact that land in Durban was fetching such fabulous prices for a good sign, instead of reading it as a danger signal. We are paying for our folly now, but I think will profit by the lesson, as Australia has done. I do not think it wise to prophesy that there will be any immediate return to a high tide of prosperity, but I do think that business affairs generally are gradually getting on a better footing, and the element of rash speculation giving way to sounder business methods. My thanks are again due to Mr. J. H. Stansell for services rendered to me by him during my term of office. It has always been a pleasure to work with him, and I can only say that the Association will be very fortunate if it can retain his services for another term. To the representatives of the Press we offer our grateful thanks for the valuable services they have given to us so liberally. Finally, in vacating the office of president, I wish to thank members for their cordial assistance at all times so cheerfully rendered.

Soil may be easily tested in order to discover whether it requires lime by the use of blue litmus paper—which may be obtained at a chemist's. A fair sample of the soil of the field to be tested should be taken and put into a cup or glass, with just sufficient water to make it pack firmly. Then thrust a knife into this soil and put a piece of the litmus paper into the hole, pressing the soil firmly around it. Leave the paper there for about 15 minutes, and then remove it. If on drying the blue colour has changed to red it may be safely concluded that the soil is sour and needs lime.

RYE OF ARBRUZZI AT WEENEN EXPERIMENT STATION.

Grown under Irrigation.

Upper Biggarsberg Farmers' Association.

PRESIDENT'S REPORT FOR 1906-7.

THE following report has been submitted by the President (Mr. Geo. Langley) to the Upper Biggarsberg Farmers' Association:—

"In submitting the report for the year just closed, I regret having to state that, although we are out of debt the balance on the right side is only a very small one.

"Owing to the spread of East Coast Fever amongst cattle in the Division of Dundee, it was deemed advisable to discontinue the holding of cattle sales at Dannhauser, consequently our income has been very much reduced. Two small sales were held during the year, and good prices were realised for the stock sold.

"In the early part of the year the subject of slaughtering fat stock at this station was considered, but this proposal was dropped owing to the Government having partly arranged for the erection of abattoirs at Charlestown.

"The dreaded East Coast Fever amongst cattle has existed in the eastern portions of Dundee Division since August, 1906, but has not spread much in this direction owing to the restrictions placed on the movement of cattle and the number of fenced farms near the railway. A new Advisory Board for the district of Newcastle has been elected under the new Government regulations, and I represent this Association on that Board, which holds monthly meetings at this station.

"A new method of dealing with this disease will shortly be in operation, viz., the compulsory slaughtering of isolated, infected, and in-contact herds, together with the fencing of farms in diseased areas.

"This Association has continued to impress on the Government the necessity of adopting this stamping-out policy. Our local members of Parliament are now in favour of this measure, and I believe we are fortunate enough to have a Minister of Agriculture strong enough and able enough to carry it through to a finish. If this stamping-out process is persisted in, I think a large number of the cattle in the Colony will be saved, and business in general will improve when confidence is restored amongst farmers and the irksome restrictions are removed from ox-transport.

"Some of the members of our Association paid a visit to Cedara in March last, but owing to weather conditions were unable to inspect the experimental plots. The visit, however, was most instructive and enjoyable, the Director and his staff having done all in their power to make it so.

"At the yearly meeting of the Agricultural Union, you were represented by the Vice-President and myself. These gatherings are yearly increasing in importance, and I would urge this Association to make every effort to be represented at each yearly Conference.

"An attempt has been made to establish a co-operative creamery in Newcastle. You were represented on the professional Board of Directors by our Vice-President. Nothing has yet been accomplished, chiefly owing to the threatened invasion of East Coast Fever. A number of farmers in this district supply the Nel's Rust Creamery with produce, and this seems to indicate the necessity for a creamery in the Northern Districts.

"A Mealie Union is now in course of formation. Probably most of you have received circulars from Maritzburg inviting you to become members. The committee is a strong and capable one, but no district north of Howick seems to be represented. It is clear that some united effort must be made for dealing with our mealie crop, which is now generally in excess of South African requirements. The methods of cultivation and manuring has vastly improved during the last few years, consequently a much better yield per acre is obtained, not to speak of the increased area under cultivation.

"Stock of all kinds have done fairly well. Sheep farmers who relied solely on the grass burns came out with a very poor crop of lambs, but those who gave their ewes a little extra food were fully recompensed for their trouble. Vaccine supplied by the Veterinary Department for inoculation against blue-tongue in sheep has generally given good results; I anticipate that there will be a good demand for this preventative during the coming summer. Many of our farms will carry sheep all the year round if the blue-tongue scourge has at last been conquered. It is more profitable to export wool than mealies, and good mutton is always a scarce commodity in Natal during the summer months.

"The attention of the Minister of Lands and Works was called to the fact that a number of Crown land farms in process of alienation are not beneficially occupied. I trust this matter will not be allowed to drop until some of these farms are made available for young men who would be glad to purchase them and fulfil the conditions under which they were originally sold.

"We have been favoured with visits from the Minister of Agriculture, the Minister of Railways and Harbours, and the Minister of Lands and Works. These interviews have been much appreciated by farmers, and doubtless good results will be obtained from the representations made to these hon. gentlemen during their stay here.

"There have been ten meetings of this Association held during the year, all of which have been well attended. I trust your new President will receive the same measure of support which has been accorded me during my term of office. As we are fortunate enough to have quite a number of members who are capable of discharging the duties of president, I trust one of them will be willing to come forward and do his duty by putting in a year's work for the benefit of his neighbours.

"In conclusion, I have to specially thank our late President, Vice-President, and Mr. J. H. Murray, our hard-working hon. secretary, for the willing and valuable assistance rendered me during the past year."

In moving the adoption of the report, Mr. Sutherland regretted that the President of the Association had omitted to make any reference to the good work done in the Division by the detective appointed on the advice of the Association for the detection of cases of stock thefts. Mr. Langley replied that this was an oversight, as he fully intended to have mentioned the matter.

"Owed" to the Land Board.

On the occasion of the recent annual visit of the Land Board to Weenen the question of the arrear instalments due on the blocks was discussed at a public meeting of the settlers. Shortly after the meeting the following ode, dedicated to the Land Board, was handed to the Chairman:—

Hail, Mighty Ones! I bow me to the soil,
On which I spend myself, my life, and toil.
I pray you harken to my humble prayer,
And let me off my just and lawful share
Of water rates. For lo! I cannot pay
A stiver on account: hence this dismay.

I owe the Board for four instalments still
Beside the water rates. The fearful bill
Haunts me by day, destroys my sleep by night—
I live and move in wild extremes of fright.
Onions and peas bring to my throbbing breast
No hope of income. All my trust I rest
On heavenly love, and in this humble prayer
I'll "Ode" the Board again, and call it square.

Experiment Farms.

CEDARA.

To Director Experiment Stations.—

The planting season is now in full swing and all hands have been specially busy on their respective branches of work.

During the early winter months the question of working hours was under consideration, when it was then decided that, provided the necessary supervision of coloured labour, and attention to live stock were taken in turn, European employees and students could then be off duty on Saturday afternoons, on the full understanding that, on the revision of the summer working time table, the concession would cease and longer working hours would be required at planting and harvesting seasons. I am now pleased to report that the system has been appreciated by all concerned and is certainly more feasible and practical than abiding by a stereotyped time irrespective of the urgency or otherwise of work.

Since my last report the weather generally has been cold and not of a nature to encourage the growth of crops. The early planted mealies were checked for the want of heat. On a very few dates only has the thermometer exceeded 90 degrees, and the maximum then was 94 degrees, the mean for the month being 78 degrees. The rainfall for October was 2½ inches. This was below the average in comparing the corresponding months of several previous years. For the month of November till date of writing—viz., 20th—over 4 inches have been registered. Of this, however, 2¾ inches fell during two thunderstorms of short duration, and obviously the heavy wash and flooding caused considerable damage generally and, unfortunately, on several sections of experimental work that had involved a good deal of labour and which will now have to be replanted, more particularly the Manure and Variety Sections of Sugar Beet. Several acres of ground that had been ridged out for experimental work was washed flat. The vlei land which previously got water-logged with similar rainfalls very quickly cleared itself, as a result of the drains that have been cut.

Every effort is now being made to get a large area of mealies planted, and (as previous experience has proved) this must be completed by the middle of December. The check rowing system of planting is being adopted and a Deere planter used, 3 feet by 3 feet 8 inches, with three Kernels dropped in the hill. Special advantage will thus be gained in cross cultivating the crop.

A valuable consignment of pedigree maize on cob has been received from Messrs. Funk Bros., America. The varieties were Yellow Dent, Golden Standard Leaming, and Boone County. The latter has been sent on to Winkel Spruit Experiment Station.

Prior to planting, and for future reference, the cobs were numbered consecutively, and photographed, as it will be interesting to follow the result of careful selection from the individual ears, the grain of each cob being planted separately.

Havoc is being done to young plants by cut-worms. The method adopted to kill them has been the use of a mixture of 1 ℔. Paris green, 50 ℔s. bran sweetened with treacle, strewn in handfuls over the infected ground. Unfortunately quite a large area was treated in this manner a few hours before a very heavy rain, which will now have rendered the preparation not so effective. However, if no appreciable result is likely to be shown the work will be repeated. Mealie top grub on the early planted crop is now much in evidence.

The working stock are healthy and in fairly good condition. The majority of mules recently received from the Transport Department were unbroken, but have now been trained, and a reasonable amount of work can be got from them. The Persian sheep are thriving well. Of the last lambing there are 16 ram lambs, some exceptionally good and true to breed. Several applications have been made for purchase when they are weaned. The poultry are healthy, and over 300 eggs were laid during the month. There are 211 chickens coming along well, and the incubators are still in use. A strip of ground adjoining the present runs is being ploughed, the fencing of which will be taken in hand as soon as possible to make it into a permanent chicken run.

The carpenter has been mainly occupied in the putting down of iron buildings, reconstruction, repairing, painting and papering several buildings. A good deal of the engineer's time was taken up in the early part of the month ploughing on the flat with the traction engine, and I wish to report most favourably on the class of work done. The students who were detailed for that work showed a keen interest.

I understand that the term of sentence on the convicts employed on the Farm will soon be up, and I hope arrangements can be made to replace them as they have proved to be a useful and reliable source of labour.

ALEXANDER REID,
Farm Manager.

CEDARA: FORESTRY SECTION.

To Director Experiment Stations.—

In response to your request for a report as to the effect upon the Cedara plantations of the severe frosts experienced during the past winter, I beg to submit a table which will show, at a glance, the position.

The columns of the table indicate as follows:—

I. Killed entirely or injured beyond recovery.
II. Cut to the ground but breaking well now.
III. Cut back severely.
IV. Cut back slightly.
V. Injured in vleis but unharmed on higher ground.
VI. Uninjured.

Species.	Date of Planting.	I.	II.	III.	IV.	V.	VI.
Acacia melanoxylon (Blackwood)	03						—
Acacia mollissima (Black Wattle)	03-06					—	
Acacia pycnantha (Golden Wattle)	06	—					
Acer Negundo (Box Elder) ...	06						—
Alnus glutinosa (Alder)	06						—
Casuarina leptoclada (Beefwood	03						—
Catalpa bignonioides	06						—
Callitris australis (OysterBayPine)	06			—			
Celtis australis	06			—			
Cryptomeria japonica (Japanese Cedar)	06						—
Cupressus goveniana (Goven's Cypress)	06						—
Cupressus macnabiana	06				—		
Cupressus macrocarpa (Scented Cypress)	06						—
Cupressus sempervirens	06						—
Eucalyptus acmenioides (White Mahogany)	04				—		
,, ,, ,,	06		—				
,, amygdalina (Giant Gum)	04						—
,, botryoides	05						—
,, citriodora (Lemon Gum)	03				—		
,, corymbosa Blood Wood)	06						—
,, corynocalyx (Sugar Gum)	03						—
,, ,, ,,	04			—			
,, crebra (Narrow leaved Iron Bark)	06			—			

Species.	Date of Planting.	I.	II.	III.	IV.	V.	VI.
Eucalyptus diversicolor (Karri Gum)	03			—			
,, ,, ,,	04			—			
,, globulus (Blue Gum)	04						—
,, ficifolia (Red Flowering Gum)	06	—					
,, Gunnii (Cedar Gum)	03						—
,, ,, ,,	04						—
,, ,, ,,	06				—		
,, haemastoma	04						—
,, ,, ...	05						—
,, hemiphloia (Grey Box)	03						—
,, ,, ,,	05				—		
,, ,, ,,	06				—		
,, longifolio (Woolly Butt)	04						—
,, leucoxylon	03						—
,, ,, ...	04						—
,, ,, ...	05						—
,, macrorhyncha (Victorian Stringy Bark)	04						—
,, maculata (Spotted Gum)	05	—					
,, ,, ,,	06						—
,, melliodora (Yellow Box)	04						—
,, ,, ,,	05						—
,, obliqua Stringy Bark)	03					—	
,, ,, ,,	04				—		
,, ,, ,,	05			—			
,, paniculata (Torr Vale Gum)	05		—				
,, ,, ,,	06		—				
,, pilularis (Black Butt)	05		—				
,, polyanthema (Red Box)	04						—
,, punctata (Leather Jacket)	03				—		

Species.	Date of Planting.	I.	II.	III.	IV.	V.	VI.
Eucalyptus rostrata (Red Gum) ...	03				—		
,, ,, ,, ..	04				—		
,, ,, ,, ...	06				—		
,, saligna	04				—		
,, sideroxylon (Iron Bark)	03						—
,, ,, ,,	04						—
,, ,, ,,	05				—		
,, Stuartiana (Apple Scented Gum)	05						—
,, Icreticornis (Forest Red Gum)	04				—		
,, ,, ,,	06						—
,, viminalis (Manna Gum)	04						—
Fraxinus americanus (American Ash)	06						—
Ginko biloba (Maidenhair Tree ...	06						—
Grevillea robusta	05	—					
Lagunaria pattersonii	06	—					
Liquidambar styraciflua (Sweet Gum)	06						—
Liriodendron tulipifera (Tulip Tree)	06						—
Pinus canariensis (Canary Is. Pine)	03				—		
,, halepensis (Aleppo Pine) ...	03						—
,, ,, ,, ...	06						—
,, insignis (Monterey Pine) ..	03						—
,, longifolia	06				—		
,, massoniana	06						—
,, montana	06						—
,, pinaster (Cluster Pine) ...	03-06						—
,, rigida	06						—
Sapium sebiferum	06				—		
Sequoia gigantea (Mammoth Tree)	06	—					
Syncarpa laurifolia	04	—					

CAPE BARLEY AT WEENEN EXPERIMENT STATION.

Grown under Irrigation.

NOTE.—The *E. maculata* and *E. corymbosa* planted in 1906 were given a particularly sheltered site, these species being known to be tender.

On compiling this list I found some of the results to appear contradictory, so have verified them all by another visit to the plantations. I attribute the results not being entirely consistent to the very local nature of the frost.

T. J. STAYNER, Forester.

STANGER.

TO DIRECTOR EXPERIMENT STATIONS.—

The results of experiments conducted with sugar cane at this Station are now to hand, and most satisfactorily confirm the data secured at Winkel Spruit and published in the October issue of the *Journal.* It is to be noted that the latter were obtained from plantations situated on sandy, hill-side soils, while the Stanger experiments were organised in rich, alluvial-bottom lands. In both cases duplicate sets of plots reduce any possible margin of error to a minimum, and the resulting body of information should be applicable to cane cultivation in any soil and situation.

At neither Station has it been possible to demonstrate any considerable profit from the use of commercial fertilisers, as applied to the first two crops on virgin soil, which is satisfactory testimony to the natural fertility of all classes of coast soils. It remains to be shown, however, at what stage a process of exhaustion may become evident in unmanured lands, and also as to how far a progressive increase in total weight of cane and saccharose may be secured from the use of such fertilisers. An almost uniform increment from the first ratoon crop is to be observed, and, in the case of the Winkel Spruit experiments, a marked shortening of the growing period. The latter feature raises the important point of the possibility of securing an annual instead of a biennial crop through the medium of stimulating fertilisers. A continuation of the present experiments upon the same lines will be necessary to the solution of these problems.

The highest absolute yield secured from manured plots was at the rate of 37 tons 1,787 lb. per acre, as compared with 35 tons 1,258 lb. obtained from the adjoining unmanured plot. This increase was secured by a medium dressing of a complete fertiliser containing nitrogen, phosphoric acid and potash, to which was added approximately half a ton of lime. The cost of this application would, of course, far outweigh the value of the immediate additional yield, and it remains to be seen whether the residual effects will reduce to any considerable extent this marked disparity. The omission of any constituent of the complete manure had

UBA CANE MANURES.

Plots 24 feet × 145 feet = 2/25ths of an acre. *Average yield Unmanured Plots = 32 tons 1,413 lbs.*

Plots.	Manures.	First Set—Planted 4th Jan., '04.						Second Set—Planted 7th Jan., '04.						Plot.	Average : Tons per Acre.	
		Cut Dec. 4th, '05.			Cut Sept 12th, '07.			Cut Nov. 14th, '05.			Cut Sept. 14th, '07.					
		Lbs. per Plot	Tons per Acre.		Lbs. per Plot.	Tons per Acre.		Lbs. per Plot.	Tons per Acre.		Lbs. per Plot.	Tons per Acre.				
				lbs.			lbs.			lbs.			lbs.			lbs.
½B	No Manure	2,049	25	1,225	3,424	42	1,600	2,251	28	275	Cut for Planting.			½ B	32	367
49	120lbs. Sulphate of Ammonia 60 ,, Dble. Superphosphate 50 ,, Chloride of Potash 1125 ,, Lime per ac	4,520	28	500	4,472	27	1,900	4,494	28	175				67	28	192
50	No Manure	3,788	23	1,350	3,864	24	300	4,505	28	312				68	25	654
51	240lbs. Sulphate of Ammonia 120 ,, Dble. Superphosphate 100 ,, Chloride of Potash per ac.	4,635	28	1,937	4,166	26	75	4,641	29	12				69	28	8
52	360lbs. Sulphate of Ammonia 180 ,, Dble. Superphosphate 150 ,, Chloride of Potash per ac.	5.361	33	1,012	4,060	25	750	4,918	30	1,475	6,682	41	1,525	70	32	1,690
53	No Manure	4,460	27	1,750	3,510	21	1,875	4,168	26	100	6,352	39	1,400	71	28	1,781
54	120lbs. Dble Superphosphate 100 ,, Chloride of Potash per ac.	4,436	27	1,450	3,804	23	1,550	4,841	30	512	7,392	46	400	72	31	1,978
55	240lbs. Sulphate of Ammonia 100 ,, Chloride of Potash per ac.	4,741	29	1,262	4,532	28	650	4,762	29	1,525	6,389	39	1,862	73	31	1,825

56	No Manure	4,472	29	1,900	5,244	32	1,550	4,524	28	550	5,884	36	1,550	74	31	887
57	240lbs. Sulphate of Ammonia 120 ,, Dble. Superphosphate } per ac.	4,655	29	187	5,480	34	500	4,748	29	1,350	5,968	37	600	75	32	1,159
58	120lbs. Double Superphosphate ...	4,390	27	875	5,516	34	950	4,196	26	450	6,032	37	1,400	76	31	1,419
59	No Manure	4,172	26	150	5,504	34	800	4,959	30	1,987	6,330	39	1,125	77	32	1,515
60	300lbs. Basic Slag	4,377	27	712	5,652	35	650	6,125	38	562	6,126	38	575	78	34	1,625
61	300lbs. Bone Dust	5,308	33	350	6,150	38	875	6,062	37	1,775	5,995	37	937	79	36	1,484
62*	No Manure	.4,395	27	937	6,220	38	1,750	5,614	35	175	6,338	39	1,225	80	35	522
63	256lbs. Nitrate of Soda 120 ,, Dble. Superphosphate 136 ,, Nitrate of Potash } per ac.	4,205	26	562	6,765	42	562	5·714	35	1,425	6,054	37	1,675	81	35	1,056
64	240lbs. Sulphate of Ammonia 120 ,, Dble Superphosphate 100 ,, Chloride of Potash 1125 ,, Lime } per ac.	4,946	30	1,825	6,568	41	100	6,613	41	662	3,064 (½ plot)	38	560	82	37	1,787
65	No Manure	4,705	29	812	6,324	39	1,050	6,073	37	1,912	Cut for Planting.			83	35	1,258
66	120lbs. Dble. Superphosphate 1125 ,, Lime } per ac.	4,736	29	1,200	6,112	38	400	6,437	40	462				84	36	21
½B	No Manure	3,392	42	800	3,252	40	1,300	3,193	39	1,825				½ B	40	1,975

GREEN NATAL CANE MANURES. LOUSIER CANE MANURES.

Plots 24 feet × 145 feet = 2/25ths of an acre. Rows 6 feet apart. Sets 4 feet apart.

No. of Plot.	Manures.	Planted January 14th, 1904.						Planted January 20th, 1904.						No. of Plot.
		Cut Nov. 14th, '05.			Cut Sept. 6th, '07.			Cut Nov. 13th, '05.			Cut Sept. 16th, '07.			
		Lbs. per Plot.	Tons per Acre.		Lbs. per Plot.	Tons per Acre.		Lbs. per Plot.	Tons per Acre.		Lbs. per Plot.	Tons per Acre.		
				lbs.			lbs.			lbs.			lbs.	
½ B	No Manure	1,500	18	1,500	984	12	600	1,006	12	1,150	1,540	19	500	½ B
85	240lbs. Sulphate of Ammonia 120 ,, Double Superphosphate 100 ,, Chloride of Potash per acre	3,104	19	800	2,684	16	1,550	1,619	10	237	3,711	23	387	91
86	No Manure	4,253	26	1,162	3,015	18	1,687	1,510	9	875	1,966	12	575	92
87	240lbs. Sulphate of Ammonia 120 ,, Double Superphosphate per acre	3,888	24	600	3,267	20	837	1,326	8	575	2,963	18	1,037	93
88	120lbs. Double Superphosphate, per acre ...	2,339	14	862	2,719	16	1,987	3,028	18	1,850	3,738	23	725	94
89	No Manure	2,135	13	687	2,872	17	1,900	3,413	21	662	2,478	15	975	95
90	300lbs. Basic Slag, per acre	1,996	12	950	2,648	16	1,100	2,372	14	1,650	2,427	15	337	96
½ B	No Manure	1,032	12	1,800	1,753	21	1,825	779	9	1,475	784	9	1,600	½ B

little effect in decreasing the yield, and the individual influences of single manurial constituents almost escape recognition. Pending the completion, therefore, of further stages in the experiment, it is impossible, in the light of results secured from two stations and four distinct sets of plots, to advocate the employment of high-priced fertilisers for sugar cane on the Natal coast. The attention of planters can more profitably be devoted to the question of a reduction in cost of production by way of labour-saving devices for the cultivation and harvesting of the crop.

UBA CANE: DISTANCE OF PLANTING.

Manures: 200lbs. Concentrated Superphosphate per acre, 2-3rds broadcast, 1-3rd in rows

No. of Plots.	Distance of Rows Apart.	Distance of Sets Apart.	Cut Dec. 4, 1905.		Cut Sept. 9, 1907.	
			Lbs. per Plot.	Tons per Acre.	Lbs. per Plot.	Tons per Acre.
½B	...	...	2,825	35 625	Plant'd	
97	5 feet	3 feet	4 946	30 1,825	,,	
98	,,	4 ,,	4,980	31 250	2,062½	25 1 550
99	,,	5 ,,	4,205	26 562	4,136	25 1 700
100	,,	6 ,,	4,252	26 1,150	4,470	27 1,875
101	6 feet	3 ,,	5 692	35 1,150	6,020	37 1,250
102	,,	4 ,,	5 471	34 387	6,025	37 1,312
103	,,	5 ,,	4 605	28 1,562	6,193	38 1,412
104	,,	6 ,,	4,451	27 1,637	5,461	34 262
105	7 feet	3 ,,	5,783	36 287	6,149	38 862
106	,,	4 ,,	5.552	34 1,400	6 368	39 1,600
107	,,	5 ,,	5,231	32 1 387	5 852	36 1,150
108	,,	6 ,	4,707	29 837	5 267	32 1 837
½B	...	...	1 985	24 1 625	2 388	29 1 700

GREEN NATAL CANE: DISTANCE OF PLANTING.

Manures: 200lbs. Concentrated Superphosphate per acre, 2-3rds broadcast, 1-3rd in rows.

4 Rows in each Plot.

No. of Plots.	Distance of Rows Apart.	Distance of Sets Apart.	Cut Nov. 5, 1906.			Cut August 5, 1907.		
			Lbs. per Plot.	Tons per Acre.		Lbs. per Plot.	Tons per Acre.	
					lbs.			lbs.
½ B		...	2 882	36	50	Cut for Planting in Zululand.		
109	5 feet	3 feet	6,229	38	1,862			
110	”	4 ”	5·282	33	25			
111	”	5 ”	5,768	36	100			
112	”	6 ”	6 304	39	800			
113	6 feet	3 ”	7·573	47	662			
114	”	4 ”	7 307	45	1,337			
115	”	5 ”	7,678	47	1,975			
			Cut Nov. 4, 1905.			Cut Sept. 7, 1907.		
116	”	6 ”	3,185	19	1,812	4,585	28	1,312
117	7 feet	3 ”	3,646	22	1,575	4,890	30	1,125
118	”	4 ”	3 340	20	1,750	5,954	37	425
119	”	5 ”	3·346	20	1,825	4,794	29	1,925
120	”	6 ”	2 827	17	1,337	4,247	26	1,087
½ B	...	...	1,499	18	1,475	2,470	30	1,750

The highest absolute yield from the "Distance of Planting" experiment was secured from a plot in which the rows were spaced at 7 feet and the sets 4 feet apart in the rows. The average return from the 6 feet rows was 34 tons 621 ℔., and from the 7 feet rows 35 tons 170 ℔., per acre. Economy in labour would further recommend the latter spacing. Even the lighter yielding Green Natal cane apparently benefits from the larger feeding area afforded by six and seven foot sowing.

WEENEN.

To Director Experiment Stations.—

The weather throughout the past month has not been very favourable for harvesting the various crops. Rain fell on eleven days, and the total for the month was 2·04 inches. Considering the weather, however, I am glad to say that all crops harvested have been taken off the land in very fair condition. Section A, Indian oats (Quantities of Water Experiments)—these are to be threshed at the Weenen Steam Mills at the earliest opportunity, and a report furnished;—Cape barley, also intended for seed; and half plots of Algerian oats harvested for forage and baled, the balance being left for seed.

The Lucerne Cultivation Plots and Drainage Experiment Section have been harvested, and good results secured from this first cutting.

A crop of barley wheat has also been taken off and promises a fair yield of clean grain. This is the earliest by some six weeks of the thirteen varieties of wheat grown at the Station. Other varieties, however, will be found more profitable.

The field of onions planted out last month has made very good growth.

I have transplanted about 4,000 tobacco plants for cigarette leaf, and about 5,000 for pipe leaf, the weather not being favourable for extensive planting during the month, but every effort will be made to push on with this work whenever a favourable opportunity occurs.

Land has been prepared for the reception of the twenty-two varieties of cotton seed now to hand.

The members of the Land Board visited the Station during their tour of inspection during the month.

W. HOSKING,
Curator.

WEENEN.

Report for September and October.

During the month of September the principal work carried out on the Orchard has been as follows:—

Ploughing and planting beans (common kafir) in Section 1. The beans were broadcasted on the land after ploughing, and harrowed in. In a month or two these beans will be ploughed in as a "green manure." In February the land will be again planted with Canadian Wonder beans which will be allowed to seed, as the latest part of the summer is the best time to grow beans for seed. The ploughing-in of the beans will greatly improve the condition of the soil for the trees, adding both nitrogen and humus, which are both very necessary in an orchard. Humus is very necessary here, as the soil is still raw and inclined to cake after irrigation.

Two pounds of superphosphate have been applied to each tree in Sections 5, 6 and 7. The manure on Section 5—"Uncultivated,"—was applied to the surface on a damp day and slightly raked. The manure on Sections 6 and 7 was applied in a circle around the tree and forked in.

The cultivator has been kept going among the trees and all weeds close to the trees hoed out by hand.

The main work during October has been hoeing to keep down weeds and the cultivating of strawberries, etc. The early crop of strawberries has been a failure this season, very little fruit setting on the plants. I believe the reason for this was that we have had several very hot, dry winds which seemed to scorch the flowers and prevented the fruit from setting. If the plants could be mulched with a good thickness of straw, I think the flowers and fruit would be protected from the scorching effect of the reflection of the sun's rays off the light-coloured soil. The strawberry plants are large and healthy and are now flowering again, and I hope the main crop will be better than the early one.

Section 4 and the Citrus Sections have been ploughed and Section 5 hand hoed. This latter section takes a lot of time to keep clean. There is a very noticeable difference already between Section 5 (just cultivated sufficiently to keep down weeds) and Section 6 (which is frequently cultivated). The trees in Section 6 are much larger than those in Section 5.

I have been busy with summer pruning and thinning fruit. Some of the Japanese plums required a lot of thinning, especially the unpruned trees in Section 2, which would have suffered severely from the weight of the fruit had they not been thinned.

Many of the peaches have a fair quantity of fruit on, as also have a few apricots, which are close on ripening.

The trees in general have made fairly good growth. The vines are looking well and some of the varieties are carrying a few bunches of grapes each. So far there have been no signs of anthracnose, owing, no doubt, to the two sprayings of Bordeaux mixture, one of which was applied in the autumn and the other in the spring just before the buds burst into growth. I have noticed vines belonging to one of the settlers here suffering badly from this fungus.

On the 29th inst. the members of the Land Board, accompanied by the Prime Minister, looked over the Orchard.

T. R. M. POLE,
Orchardist.

WINKEL SPRUIT.

To Director Experiment Stations.—

With the exception of 30 or 40 tons left for planting purposes, all of the cane was cut and trucked to the mill and to planters, the total amount dispatched being 556,618 lbs., or 278¼ short tons. The results

BARLEY WHEAT AT WEENEN EXPERIMENT STATION.
Grown under Irrigation.

from the Distance of Planting Uba cane varied very little from last year's results, the total difference from the whole section being only 137 lbs. Appended are the results for the two seasons for comparison:—

DISTANCE OF PLANTING UBA CANE.

Plots.	Area.	Feet between Rows.	Feet between Sets.	Cut January, 1906.			Cut September, 1907		
				Lbs. per plot.	Tons per acre.		Lbs. per plot.	Tons per acre.	
						lbs.			lbs.
¼B		5 feet	3 feet	948	28	1,880	1,481	48	860
73	$\frac{1}{15}$ of an acre.	„ „	„ „	4,120	30	1,800	4,513	33	1,695
74		„ „	4 „	4,811	36	165	4,731	35	965
75		„ „	5 „	4,880	36	1,200	4,253	31	1,795
76		„ „	6 „	4,954	37	310	4,312	32	815
77	$\frac{2}{25}$ of an acre.	„	3 „	5,853	36	1,162	5,378	33	1,225
78		„ „	4 „	4,123	25	537	5,044	31	1,050
79		„ „	5 „	5,001	31	512	5,169	32	612
80		„ „	6 „	4,921	30	1,512	5,096	31	1,700
81	$\frac{4}{43}$ of an acre.	7 „	3 „	5,853	31	920	6,198	33	628
82		„ „	4 „	5,500	29	1,125	5,497	29	1,092
83		„ „	5 „	5,545	29	1,609	5,228	28	201
84		„ „	6 „	4,859	26	239	4,518	24	568
¼B		„ „	3 „	1,062	22	1,666	1,149	24	1,407
Total yield ...	...			62,430 lbs.			62,567 lbs.		

Results tabulated from the Green Natal and Lousier canes show a marked decrease from the ratoon crop. It is very evident that light, sandy soils are not suitable for these canes; and, as arranged with you, an experiment will be carried out on dark, heavy soils.

The usual farm work is progressing very satisfactorily. Two teams are continually ploughing. Weeds are growing very fast, having had a good start owing to all hands attending to the cane-cutting, etc.

Asparagus and rhubarb plants were transplanted into permanent beds and are making fair growth. The onions have every appearance of returning an excellent yield.

Most of the trees have been pruned in the orchard; and land is being prepared for planting 5,000 more pineapples.

The oxen, though constantly working for the past three months, are in good condition and show little signs of lagging.

The three students now stationed here are giving entire satisfaction.

Two varieties of barley were harvested during the month, viz., Smyrna and Cyprus. The former Menesuien gave a good yield of grain, but the grain is rather dark, while the Cyprus, giving a lighter yield, is a good, sound, well-formed seed, of a good colour.

W. JOHANSEN,
Manager.

Gardening Notes for December.

By W. J. Bell, Nurseryman, Florist and Seedsman, Maritzburg.

KITCHEN GARDEN.

The main sowing of cauliflower should be put in this month for planting out in February. The two best varieties for Natal are the well known Veitch's Autumn Giant and Early London. With high cultivation the first-named variety can be grown to an enormous size. Specimens have been grown in this Colony weighing 24 lbs. and of fine quality. The seed bed should be well prepared before sowing and the soil enriched with well-decayed manure dug in and thoroughly incorporated with the soil. Sow the seed thinly and evenly and shade immediately with some kind of litter such as hay or straw. If the seed has been sown too thickly it will be a good plan to prick out the young seedlings when about two weeks old on to another well-prepared bed, leaving sufficient space between to allow of each being lifted with a ball of soil when large enough to be planted out. By this method healthier and stronger plants are produced than when planted out direct from a crowded seed bed. Water the bed twice a day, morning and evening, in dry weather.

If cabbage aphis appears, use a little lime in the water occasionally—the common Colonial lime that has been well slaked, not fresh stone lime, which is too strong and will burn the leaves.

If celery has not been sown it should be put in at once, as it is very slow during the seedling stage and requires quite three months from sowing before the young plants are strong enough for planting out. Whatever shading has been provided for the celery bed must be removed in dull and wet weather, but replaced again on hot days until the seedlings are strong enough to withstand the heat, as, until this stage has been reached, a few hours of hot sunshine will wither them up past recovery.

A later sowing of tomato may be made this month for succession, and where there is little or no frost in winter further sowing may be continued during January and February.

Sow also for succession French beans, cabbage, carrot, beet, lettuce, radish, onion, leek, mustard and cress.

One of the finest lettuces to grow now is "Webb's Wonderful." Sown in rich soil and planted two feet or more apart, immense heads can be obtained quite as tender as the smaller sorts.

Stake and tie up tomato plants as required, and when the fruit has set give occasional doses of liquid manure. If extra fine fruits are required, pinch out the laterals and disbud freely.

FLOWER GARDEN.

All the tender varieties of flower seeds may still be sown this month for flowering in March and April, such as Balsams, Cockscomb, Portulaca, Marigold, Sunflower, Cosmos, *Centaurea Americana,* Nasturtium, Zinnia, etc. Sow also Aster, Phlox, Dianthus, Candytuft, *Chrysanthemum tricolor,* Calandrinia, Carnation, Coreopsis, Heliopsis, Hunnemannia and Helichrysum, Gaillardia double and the large single perennial.

Carnation seed should be sown in tins or shallow boxes, well drained, using good soil. A large proportion of fine double flowers may be obtained from Douglas's Selfs and Fancies, which if sown now will bloom next spring and early summer. The young seedlings should be pricked out a few inches apart into other boxes or a small bed from which they may be finally planted out when large enough. The Everblooming Malmaison Carnation should also be sown now for spring flowering. This is a fine strain, and will produce a large quantity of sweetly scented double flowers of all shades.

The *Centaurea Americana* is a grand acquisition to the list of garden flowers, and is very easily grown from seed, whch should be sown at once. In good soil it will grow four or five feet in height, producing large rosy lilac flowers in profusion on long straight stems, and is therefore good for cutting.

The Calandrinia is another flower seldom seen in Natal gardens. The flower resembles a Portulaca, but is borne on stems 9 or 12 inches long. Colour, rosy lilac; and very free flowering.

Violet roots for winter flowering may be planted this month. The most useful varieties are The Czar—single blue and white;—Princess of Wales—single pale blue;—Kaiser Wilhelm—large single purple;—Neapolitan—double lavendar;—Swanley White—double white. Dig out a trench and fill in with good soil and well decayed manure, and plant 9 or 12 inches apart.

The herbaceous border should be well attended to this month. Give liquid manure to Perennial Phlox, Pentstemons, Cannas, Rudbeckias, etc., that are beginning to bloom.

Plant out Chrysanthemums in rich soil and mulch the surface round each plant with old manure. There is nothing checks them so much as hardening of the soil about the roots caused by the frequent watering rerequired in dry, hot weather. Moreover, with a good mulch less watering is required as the moisture is conserved.

Plants of the beautiful *Mina lobata* should be put in now for autumn flowering. This is a grand creeper for verandah trellis or porch, and with a warm aspect will continue to flower all the winter.

The *Bignonia Venustu* (Golden Shower), also a winter bloomer, may be planted now.

All kinds of evergreen fruit trees should be planted without delay, such as orange, naartje, lemon, lime, loquat, guava, etc., also evergreen fence plants such as Thuja, Japan Privet and Eugenia. For fences these are usually planted half a yard apart.

Correspondence.

A VETERINARY QUERY.

To the Editor of the "Agricultural Journal."

Sir,—Can you kindly inform me what is best to be done in the following case:—

I have a black horse, in good condition, but do what I will I cannot cure the hair falling off his face and head. For some time I have used paraffin and castor oil, and several times I thought he was cured! Hair restarted, but it comes on again very suddenly—first showing a dirty face and next day the hair is all off again. Otherwise his coat is splendid. I have washed the stable out with Little's dip, but without success.

Thanking you in anticipation,—Yours, etc., S.

[The above letter was referred to the Chief of the Veterinary Division (Mr. W. M. Power), who furnishes the following note:—

An ointment composed of the following—tinct. iodine, 1 drm.; mercury ointment, strong, 2 drms.; and vaseline, 2 ozs.—should be applied three times in one week and washed off the following day after each dressing with a little warm water to which a little sheep dip has been added. Manger, headstalls, bridles, etc., should also be thoroughly disinfected.

Treatment on these lines has been found most effective in many cases of this disease.]

STEAM PLOUGHS.

To the Editor of the "Agricultural Journal."

Sir,—In view of the possibility of East Coast Fever denuding the country of oxen, I wish to gather all the information necessary before purchasing a steam ploughing outfit, and will be glad if you could kindly give replies to the following questions:—

(1) What is the best type of engine and plough?
(2) What is price of same and working cost?
(3) Can engine be used for ordinary traction purposes?
(4) What is ploughing capacity per day?
(5) Can deeper tillage be done than with the ordinary ox plough?—

Yours, etc.,

"WEENEN."

[There are two entirely different systems of steam ploughing, each of which has its advocates. The first system is that in which the engine or engines remain stationary whilst the plough is hauled across the ground by means of a steel cable. In this system, again, there are two variations: either one or two engines may be used. In the former case the one engine hauls both ways by means of an anchored pulley at the other end of the furrows. The second system is that known as direct traction.

For a hilly country like Natal, the cable system is undoubtedly the better one, the two-engine type being preferable to the single-engine. The initial expense is, of course, heavy. For example, a set of two engines (including 1,800 yards of steel cable) would cost about £2,800; a 4-furrow (say) balance plough would run into about £200; a cultivator, with nine and eleven tynes, would also cost about £200; and a harrow about £140. In addition, a watercart, with hand-pump and suction and delivery pipes, would run into about £70. As regards working expenses, the wages of a chargeman, an engineer for each engine, and one or two natives, must be taken into consideration, in addition to purchase of coal and transport of coal and water. These latter expenses, of course, will vary with circumstances.

For the direct traction system, an engine will cost, roughly, from £700 to £900 or more. There are several direct traction outfits at work in different parts of the country; and on ground which is firm enough to furnish a firm track for the engine, they work satisfactorily.

The engines in either system can, of course, be used for ordinary traction purposes, and may also be used stationary.

It is difficult to state anything definite as regards ploughing capacity per day, as everything depends on the nature of the ground. As regards the cable system, it is stated that 20 to 30 acres per day can be done "under favourable conditions with the tackle in perfect order." Tillage can, of course, be done far deeper than with the ordinary ox-plough; and this fact constitutes one of the great benefits of ploughing by steam power. Ploughs are made to work to a depth of 30 inches; and, owing to the deeper loosening of the soil and to the excellent preparation of the surface, the injurious effects of drought or excessive rain are considerably obviated.—Ed.]

POTATO-GROWING EXTRAORDINARY.

To the Editor of the "Agricultural Journal."

Sir,—In the September number of the *Journal* an example of "Potato-Growing Extraordinary" was given, but I think a crop of potatoes I reaped last January exceeded the one obtained by Mr. Konigkramer.

I had 2¼ acres of ordinary land turned over in September, 1906, and gave it a good dressing of kraal manure. I then ploughed the land again, drilled it—drills 2 feet apart,—and planted the seed ("Up-to-Date"). Some of the seed was cut; and the distance apart was two feet. The drills were closed with the harrow, turned upside down. I ran the weeder over the field twice every day till the potatoes were up, and then scarified them; and, when high enough, they were earthed up, also with the scarifier. On January 28th, 1907, I started getting the potatoes up, using a potato-digger, and the total I got from the field was 221 bags. As to size and weight, I don't think they could be beaten, the average weight being 1½ lb. each, the smallest potato being ¾ lb. and the largest 2¼ lbs. I have plenty of witnesses to prove this.

As to the question whether potato-growing pays: I sent 150 bags of those potatoes to the market, and they realised 2s. 3d. per bag. Expenses were: Sacks, 7d. each; rail, 5¾d.; transport, 9d.—total, 1s. 9¼d., besides dues and commission, seed, and labour. This speaks for itself. I send no more potatoes away, nor have I planted any since.

At the same time, I also planted a field—three acres of vlei land—with "Early Rose," using potato fertilizer as manure, but owing to heavy rains they were all swamped.

You are at liberty to publish this.—Yours, etc.,

P. WERNER.

Grovehurst Park,
Beaumont.

P.S.—I forgot to mention the quantity of seed: Eight bags of "Up-to-Date" were planted. Potatoes were small; the larger ones were cut. There was no hand-hoeing, and the scarifying and earthing up I did myself. I also worked the digger.—P.W.

WOOD ASHES.

To the Editor of the "Agricultural Journal."

Sir,—Can you inform me through the medium of the *Agricultural Journal* what the fertilising value of a ton of wood ash is? What quantity should be applied for a dressing on average poor land? What would be the most suitable crops to fertilise with ashes? Would the benefit of applying wood ash to light, sandy soil be equal to applying it to heavy vlei land? Thanking you in anticipation,—Yours, etc.,

"MOOI RIVER."

Mr. E. R. Sawer (Director of Experiment Stations), to whom the above letter was referred, replies:—

Unleached wood ash may be regarded as a valuable potash manure, containing from 3 per cent. to 7 per cent. of this ingredient in a form which is readily available for the use of plants. Higher percentages of potash are obtained from young sap-wood and leaves than from mature timber. Coal ash is practically worthless as a source of potash. Wood ash also contains about 2 per cent. phosphoric acid and some 30 per cent. lime, and has a consequent approximate value of £2 19s. per short ton, calculated on the average unit values adopted for fertilisers sold on the Natal market (*vide* Bulletin No. 12, 1906). Ten times the quantity of wood ash would be required to secure results approximating to those obtained from a given dressing of the chloride (muriate) of potash, and as 100 ℔. per acre of the latter fertiliser has often been found an economic application, 1,000 ℔. of wood ash could probably be profitably employed in most cases. The ash has a further beneficial effect in obviating the attacks of insect pests to which it is markedly noxious, and both in this connection and from the manurial standpoint is particularly suitable for employment with tobacco, potatoes, legumes, and such cruciferous crops as cabbage and cauliflower. Leachin is less rapid and residual effects are more marked in a clay soil than in sandy loams, and the lime content of the ash exerts an opening and flocculating action on stiff lands.

APICULTURE: A RISING INDUSTRY.

To the Editor of the "Agricultural Journal."

Sir,—It is a great source of pleasure to me to see what gigantic strides bee-culture has made in this Colony within the last few years. Where a few people kept a hive or two for the purpose of providing honey for their own table, there are now hundreds who keep apiaries on quite a large scale, and are buying up all kinds of cans and jars to fill with honey for Natal consumption.

The old "milk box" home-made hive is now going out of date, and giving place to up-to-date modern hives. I can quite understand this, and am confident that the bee-keeper who has tried one of these hives would never go back to the old antiquated bee-smothering box hive, in which you get pollen, brood and honey in one confused mass. I personally have never used one of the home-made hives, but I was present one day at the opening of one owned by an apiarist who had never tried frame hives. On opening the hive, he had to cut away the combs from the roof, and slice off the layer of comb containing the honey, after which operation he calmly dropped each comb—shining with honey as it was—pellmell into the box, thus killing and smothering scores of bees, as well as damaging the young brood. He seemed quite happy and contented with himself. I advised him to get a Danzenbaker hive from Steel, Murray & Co., which he did, and he is now gradually replacing all his boxes with Danzenbaker hives. Needless to say, he gets more honey and more money.

Many beginners in bee-culture are troubled and disheartened by a new swarm clearing out of a new hive a day of so after "hiving," even though the queen's wings are clipped. This can easily be righted by tacking a strip of queen-excluder zinc over the entrance. The bees will probably swarm out, but the queen is caged, and the swarm is bound to return to her, and will eventually settle down to work. I know of many beginners who have lost their first swarm by trusting solely to the queen's clipped wings, but it is a well known fact that bees will carry their queen away bodily, even though her wings be clipped.

I should be glad if any of your many readers would kindly give us their experience of growing

BUCKWHEAT FOR BEES.

The Americans are great advocates of this plant as a honey producer. I have sown a patch as a trial, and it is now in full bloom. I am watching it carefully, but it seems rather a failure, as far as bees are concerned, as I do not see many bees at work on it. Yet there must be a considerable amount of honey there and easy to get at, as I notice flies and all kinds of insects at work on its flowers. There are a few bees occasionally on it, but they seem to flit very rapidly from flower to flower, never stopping for more than a second on each.

Mignonette seems to be one of the best honey plants in a garden. You can always depend on finding a bed of this sweet-scented annual covered with bees.

Now that the summer has arrived, each hive should be on a stand with legs, and each leg should be inserted into a small tin can, filled with paraffin and water, to keep ants out of the hive. Ants are greatly to be feared, especially if a colony is weak. About a month ago, a small swarm of mine suddenly left their hive, although it contained brood in all stages. On examination I found a nest of ants under the hive, and the ants were filing up the legs in hundreds. I adopted the old plan of putting the legs in paraffin and water, and I have had neither ants nor any other trouble in the hive since. A very strong colony will keep the ants out, but, in the case of a weak swarm, the ants take complete possession. Frogs and toads are also great enemies of the honey bee, especially when the hive is right on the ground, without a stand. The frogs will just sit on the alighting board, and immediately a bee pops out to see what is thumping about on his verandah, he is captured and eaten at once. This usually happens at night. There is little to fear from these gentlemen provided the hive is on a stand, although they are occasionally known to leap up on to the alighting board in search of their prey, but this rarely happens.—Yours, etc.,

OBSERVER.

Pietermaritzburg.

[See "Notes and Comments."]

Crop Reports for October.

THE month of October was characterised, as regards meteorological conditions, by a sufficiency of rain in practically all the districts of the Colony from which we have received reports. Four reports only speak of "insufficient" rainfall; whilst on the other hand our Nqutu correspondent states that the rain in his district has been excessive. Hailstorms have commenced, and reports from Glencoe Junction, Wyford, Ladysmith, Newcastle, Olivier's Hoek, Nkandhla, Utrecht, Vryheid, Glenisla, Krantzkop, and Greytown, report damage done—in most cases slight. In Nqutu district considerable damage was done by high winds.

Reports regarding the mealie crop are commencing to come in. Our correspondents at Olivier's Hoek, Newcastle, Krantzkop, Maputa, Muden, Glencoe Junction, Ingogo, Nkandhla, New Guelderland, and Darnall, state that the prospects of the crop in their respective districts are very promising. As far as can be seen, the potato and forage crops are doing well; and such reports as we have received of the wattle bark crop indicate favourable prospects. Notwithstanding damage, doubtless done by hailstorms, the prospects of the fruit crop are reported good, and apparently good results will be obtained. Camphor, cinnamon and pimento are doing very well on the coast; and chicory is being tried at Muden for the first time this season. Our Tongaat correspondent, writing on the 1st November, reported that cane planting in his district was then about completed, and the earlier planted canes were coming up very well.

Prices of live stock are reported good in the Nel's Rust, Richmond, Elands Kop, Creighton, Himeville, Riet Vlei, Ladysmith, Glenisla, Seven Oaks, Newcastle, and Pinetown districts. The prices of eggs and poultry have been low in most districts from which reports have been received. Milk and butter have, on the other hand, been, generally speaking, high.

Locusts are being reported upon by most of our correspondents; particulars of their movements (compiled from his own reports) are given by the Entomologist, in his monthly "Notes," in another portion of this issue.

South African Markets.

The prices for live stock and animal and vegetable produce, realised on the principal South African markets during the month of October-November, have averaged as follows:—

NATAL.

PIETERMARITZBURG.

The Market Master has furnished the following prices realised on the Maritzburg market during the month:—

Live Stock.—Fowls, 2s; ducks, 2s 6d; turkeys: cocks 12s, hens 5s 6d; guinea-fowls, 3s; rabbits, 1s 6d.

Animal Produce.—Bacon, 7d per ℔; ham, 9d per ℔; lard, 8d per ℔; pork, 5d per ℔; eggs, 10d per dozen; butter, 10d per ℔; cheese, 9d per ℔; hides, 7d per ℔; honey, 7d per ℔.

Vegetable Produce.—Beans, 12s per 100 ℔s; buckwheat, 10s per 100 ℔s; earth nuts, 10s per muid; barley (green), £2 per ton; oats (green), £1 10s per ton; lucerne: green £3 10s, dry £4 per ton; hay, £1 per ton; amabela, 12s per muid; mealies, 9s 6d per muid; Japanese millet, 4s per 100 ℔s; onions, 12s per 100 ℔s; peas, 8s 6d per 100 ℔s; potatoes, 5s per 100 ℔; sunflower seeds, 7s per 100 ℔s; sweet potatoes, 2s 6d per muid; tobacco, 6d per ℔; bananas, 1s 3d per 100; oranges, 4s per 100; naartjes, 4s per 100; plums, 4d per ℔.

DURBAN.

The Market Master reports the following average prices realised during the month ended 15th November:—

Live Stock and Animal Produce.—Sucking pigs, 5s 6d; fowls, 1s 10d; ducks, 2s 7d; guinea-fowls, 3s 3d rabbits, 1s 3d; eggs, 1s 1d per dozen; butter, 1s 2d per ℔; pork, 3½d per ℔.

Vegetable Produce.—Amadumbe, 3s per muid; earth nuts, 12s 6d per muid; Kafir corn, 10s per muid; mealies, 10s per muid; potatoes, 9s per muid; sweet potatoes, 4s 6d per muid; turnips, £3 per ton.

TRANSVAAL.

JOHANNESBURG.

Mr. Alfred Webb, produce agent, P.O. Box 2342, Johannesburg representing the farmers' co-operative associations of the Cape Colony, has furnished the following prices realised on the Johannesburg market during the week ended 14th November.

Market Prices.

Live Stock.—Oxen: slaughter £8 to £16 each, dressed £1 17s 6d to £2 2s per 100 ℔s; cows (milk), £16 to £33; sheep: slaughter hamels 16s to 24s each, dressed 5d to 5½d per ℔; pigs, 3d to 3½d per ℔, live weight; donkeys, £6 to £8 10s each; mules, £14 to £20; fowls, 2s to 3s; ducks, 3s to 3s 6d each; geese, 5s to 6s; turkeys: cocks 10s to 16s, hens 5s to 7s.

Animal Produce.—Butter, 1s to 1s 6d per ℔; eggs: new laid 1s 9d to 2s, fresh 1s 3d to 1s 6d per dozen.

Vegetable Produce.—Bran, 6s 9d to 7s per bag of 100 ℔s net; barley, 7s to 7s 6d per bag of 160 ℔s net; beans (dry), £1 to £1 17s 6d per bag of 200 ℔s net; chaff, 2s 6d to 4s 6d per 100 ℔s; forage, 4s 6d to 6s 3d per 100 ℔s; Kafir corn, 11s to 12s 6d per bag of 200 ℔s net; lucerne (dry), 4s to 6s 3d per 100 ℔s; mealies, 8s 9d to 9s 6d per bag of 200 ℔s net; onions, 16s 6d to £1 10s per bag of 120 ℔s net; oats (seed), 6s 6d to 10s per bag of 130 ℔s net; potatoes, 10s to 17s 6d, medium 5s to 9s 6d per bag of 150 ℔s net; sweet potatoes, 7s per bag of 120 ℔s; turnips, 1s 6d to 3s per bag; bananas, 2s to 4s per 100; grenadillas, 2s 6d to 3s 6d per 100; lemons, 2s to 8s per 100; naartjes, 3s 6d to 6s per 100; oranges, 2s to 6s 6d per 100.

Notes.

Mr. Webb also contributes the following notes on the Johannesburg produce market:—

Live Stock.—I have little to add in regard to this section since my last notes. Prices for both beef and pigs are somewhat easier, and supplies are coming forward freely. Best class mutton is also a trifle lower, whilst second-grade is sold down to 4½d. Farmers continue to forward mixed qualities, which is a great mistake. Nothing spoils the sale of good animals so much as being trucked with inferior stuff. The same care should be taken in trucking sheep as in trucking grain, forage or lucerne. Careful grading and selection will always pay well, and this cannot be too often dinned into the ears of our farmers. The present haphazard way of doing business must be altered if the best financial results are wanted.

Poultry.—A large business continues to be done in this department, and prices will advance as Christmas approaches.

Butter.—This article is arriving in increasing quantities, some consignments being of excellent quality. Considerable business can be done outside of the morning market.

Eggs are still coming to hand in sufficient lots, and prices remain fairly firm at current rates.

Mealies have shewn an advance of nearly ten per cent. during the month, but prices are expected to ease off towards the end of the year. The oversea market found by Natal farmers has caused a shortage in local supplies, which is reflected in the better prices obtainable.

Kafir Corn is firmer than known for many months, good quality both Red and White causing animated bidding. Much more can be consigned to this market than is at present coming forward.

Potatoes.—New season's have ousted the old stock almost entirely, and prices for best qualities are fairly remunerative. Consignments of the early varieties should be forwarded as quickly as possible. The recognised market weight per bag is now 150 lbs.

Onions.—Best dry Yellows are realising excellent prices, and consignments should be sent forward regularly.

Beans.—Best qualities Sugar and Rangoon are firm at highest rates, whilst a good enquiry exists for Canadian Wonders. Kafir varieties are easier.

Forage.—The market has been rather poorly supplied in this article during the month, and prices have accordingly remained above expectation. Very little last season's forage now comes to hand, supplies being mostly new season's grown in this Colony. Farmers should be careful to see that the forage is properly dried before being packed and pressed.

Lucerne Hay.—Almost the same remarks apply to this article as to forage. Owing to the prolonged drought in the Cape Midlands very little Colonial is coming forward. The locally grown article is, however, of splendid quality, and, being well-cut, pressed and wired, reflects the greatest credit upon the producers.

Fruit.—Cape strawberries, cherries and apricots have come in, and the fruit season may be said to have commenced. Very fair prices generally obtain in this section, especially for early consignments of new varieties.

CAPE COLONY.

The following information has been compiled from the last available report of the Cape Superintendent of Agricultural Co-operation (for the week ended 16th November), appearing in the *Cape Times*:—

The produce market showed a tendency during the week under review again to weaken slightly, but this may be attributed to merchants having fulfilled country and oversea business; while buyers are being influenced to postpone further purchases as far as possible in view of the near approach of new season's produce. Oat hay has again weakened, and new season's crops are expected to reach a very low figure.

Live Stock and Animal Produce.—Fowls: small 1s 2d to 1s 4d, medium 1s 6d to 1s 10d, large 2s 3d to 2s 10d; ducks, 3s to 3s 9d; turkeys: cocks 5s to 9s each, hens 4s 6d to 6s 6d; geese, 3s 6d to 4s 9d; ostrich eggs, 1s each (in demand); eggs: fresh 9s to 10s per 100, not guaranteed 8s to 9s 6d per 100 (supplies not equal to demand, and prices are firm as quoted); butter, best, 1s 4d wholesale, 1s 9d retail; Colonial Cheddar cheese, 9d to 10½d per ℔, delivered Capetown; Colonial Camembert cheese, 9s per dozen; Colonial National cream cheese, 4s 6d per dozen.

Vegetable Produce.—Merchants were offering 6s 7½d per 150 ℔, delivered Capetown Docks, for oats for export, the price having receded in consequence of the London market prices weakening. The attention of farmers still holding stocks of oats is invited to the fact that the local demand is comparatively very little, and that the new crops are expected to be large. Owing to a drop in the Australian wheat prices, the local market is slightly easier, and buyers are now offering 20s to 21s for January and February deliveries, or 22s for immediate delivery, *ex* country stations.

The following prices are recorded in respect of the week under review:—

Colonial wheat, per 200 ℔: New season's, Caledon, 1st, 20s to 21s; Malmesbury, 20s 6d to 22s; Moorreesburg, 20s to 20s 6d; Porterville-road, 21s to 22s 6d.

Colonial oats, per 150 ℔: Caledon, 1sts, 6s to 6s 3d; 2nds, 5s 6d to 5s 9d; Moorreesburg, 7s to 7s 1½d; main line, 7s 3d to 7s 4d; Malmesbury, 7s to 7s 3d.

Colonial barley, per 150 ℔; Moorreesburg, 7s 9d to 8s; main line, 8s to 8s 6d; Caledon, 7s 6d to 7s 9d.

Colonial rye, per 200 ℔: Country stations, 18s to 18s 6d, *ex* stores, Capetown, 18s 9d to 19s.

Kafir corn, per 200 ℔: Red, 13s 9d to 14s; white, 12s 6d to 12s 9d, *ex* stores, Capetown.

Bran, per 100 ℔, 5s 3d to 5s 4½d, *ex* stores, Capetown.

Mealies, per 200 ℔, *ex* stores, Capetown: Natal yellows, 13s 6d to 13s 9d; O.R.C., small yellows, 13s 9d to 14s; Natal white coast, 13s to 13s 6d; Eastern Province Germans, none offering; Eastern Province mixed, 13s to 13s 6d.

Forage, per 100 ℔: Colonial lucerne hay, 4s 6d to 4s 9d, *ex* stores, Capetown. Colonial oat-hay, 3s 2d to 3s 3d, main line stations; 3s to 3s 1½d, Moorreesburg and Malmesbury. Colonial fodder, 4s 6d to 4s 9d, *ex* stores, Capetown. Colonial compressed chaff, 1s 8d to 1s 9d, main line stations; 1s 3d to 1s 7d, Moorreesburg and Malmesbury.

Vegetables and Fruit.—Beans: green 7s 6d to 12s per bag, Natal and sugar: 40s per bag (in demand); potatoes: new season's 7s 6d to 10s 6d per bag, second quality 3s 6d to 5s 6d per bag; sweet potatoes, 6s to 7s 6d per bag (in demand); onions (new season's), 11s to 12s 6d per bag; green peas (fresh) 6s to 8s 6d per bag; tomatoes, 4d to 6d per ℔; apricots, 1s to 5s per 100; plums, 1s to 4s per 100, small; Cape lemons, 6d to 1s 3d per box of about 100-150; limes, 2s 6d to 6s per 100 (in demand); bananas, 17s to 18s per case, choicest, 20s to 24s per case; pineapples (E.P.), 3s per dozen; oranges, market has been over-supplied during the past week, consequently prices are lower than last week, excepting for extra large, which sold from 6s to 10s per 100, medium 3s to 5s 6d per 100, small 1s 9d to 2s 6d per 100; naartjes: large 6s to 9s per 100, medium 2s 6d to 4s per 100; apples, Cape, 6s to 7s per 100 to 150, imported 35s to 41s per cask.

KIMBERLEY.

Messrs. James Lawrence & Co., Ltd., P.O. Box 301, Kimberley, supply the following report dated the 15th November:—

The market is firm and meals and flour have maintained last week's advances. Mealies and kafir corn have also firmed. Forage and oats very plentiful and cheap. Bran has not advanced in sympathy with meal. Chaff plentiful. Lucerne hay in demand. Onions are weaker owing to new season's arriving. No demand for old season's potatoes, but ripe large new season's are firm. Butter weaker. Eggs have advanced slightly. Large demand for fat poultry. Oranges and naartjes, cabbages and cauliflowers in demand. Fair assortment of other fresh vegetables. Little doing in live stock. No demand for pigs.

Live Stock.—Oxen (good) prime, 600 ℔s upwards, £10 to £15; cows (good) 450 ℔s upwards, £5 10s to £8; calves, 5½d per ℔ dead weight; pigs, 100 ℔s (clean), 3d to 3¼d per ℔ live weight; lambs, 30 ℔s, 11s to 13s; hamels, 40 ℔s to 45 ℔s, 14s to 17s; trek oxen, £7 to £8; riding horses, £10 10s to £27 10s; draught horses, £10 to £25; mares, £10 to £25; fowls, 1s 6d to 2s 6d; ducks, 3s to 3s 9d; turkeys, 7s to 15s.

Animal Produce.—Butter: fresh 1s to 1s 4d, second quality 9d to 11d per ℔; eggs, 1s 2d to 1s 5d per dozen; hams and bacon, 5d to 8d per ℔.

Vegetable Produce.—Bran, 6s to 7s per bag of 100 ℔s; barley, 7s 6d to 12s per bag of 163 lbs; beans: sugar 30s to 40s, Kafir 13s to 17s 6d per bag of 203 lbs; chaff: Colonial 6s 6d to 12s 6d per bale, Colonial pressed 3s 3d to 4s per 100 lbs; forage: good 5s to 6s, inferior 3s 6d to 4s 6d per 100 lbs; Kafir corn: South African mixed 9s 6d to 11s, white 12s 6d to 16s; Boer meal, Colonial: unsifted 29s to 31s 6d, sifted 30s to 36s; flour, Colonial, 17s to 18s per bag of 100 lbs; mealies: yellow Colonial 9s to 10s 6d, white Colonial (hard) 9s to 10s, mixed 8s 9d to 9s 9d, per 203 lbs; mealie meal: O.R.C. 11s to 12s, white 11s to 12s per 183 lbs; Cape oats, 9s to 10s 6d per bag of 150 lbs; lucerne hay, 3s 6d to 5s per 100 lbs; onions, 22s 6d to 27s 6d per bag of 120 lbs; potatoes, 3s to 6s, new 9s to 16s, local district 7s to 10s; tobacco: good 4d to 7d per lb, inferior 2d per lb; wheat, 20s to 24s per bag of 203 lbs; oranges, 5s to 9s per 100; lemons, 2s to 4s per 100; naartjes, 4s to 6s per 100; pineapples, 3s to 4s per dozen.

ORANGE RIVER COLONY.

Bloemfontein.

The Bloemfontein *Weekly Post* publishes the following prices realised on the Bloemfontein market on Saturday, 16th November:—

Live Stock and Animal Produce.—Fowls, 2s 3d to 2s 9d; dressed fowls, 2s 6d to 3s; geese, 5s to 6s; ducks, 2s 9d to 3s; eggs, 1s to 1s 3d per dozen; butter, 1s 3d to 1s 9d per lb.

Vegetable Produce.—Mealies, 7s 6d to 10s 3d per bag; Kafir corn, 14s to 15s per bag; oat hay, 5s to 6s 3d per 100 lbs; chaff, 4s 6d to 5s 9d per 100 lbs; Kafir corn chaff, 2s 6d to 4s per bale; barley, 8s to 10s per bag; bran, 7s 6d per bag; oats, 10s to 11s per bag; potatoes, 7s 6d to 12s per bag; oranges, 5s to 8s per 100; pineapples, 1s 6d to 2s 6d per dozen; apples, 5s to 8s per 100.

WOOL, MOHAIR, ETC.

Messrs. W. Dunn & Co., Durban, in the course of their report on wool, mohair, etc., give the following prices:—

Wool.

On the market this week there were 3,000 bales offered, of which about 1,500 bales were declared not sold, as prices offered were ½d. to ¾d. under valuation. The drop in the market is due no doubt to the financial trouble in America, but we hope for an improvement shortly.

Transvaal and West O.R.C.

Good long light, 12 months, 7d to 8d; average ditto, 6½d to 7½d; heavy inferior ditto, 5½d to 6¼d; superior short clean, 6½d to 7½d; earthy heavy ditto, 5d to 5½d.

Harrismith and Vrede District.

Good light, 12 months, 7½d to 8¼d; average ditto, 6½d to 7d; short clean, 6-9 months, 6½d to 7d; heavy inferior, 12 months, 6d to 6½d; earthy heavy, 5½d to 5¾d; average fair ditto, 6d to 6¼d.

Native Wools.

Basutoland, 6½d to 7¼d; East Griqualand, 7½d to 8½.

Mohair.

The market for this staple has been stagnant. Out of 150 bales offered, about ten were declared sold. We do not expect an improvement for some time. Stocks in town are about 700 bales, principally mixed.

We quote:—Superior long sorted O.R.C. and Transvaal, 13d to 13½d; fair average, 11½d to 12d; mixed, 10½d to 11d; coloured and kempy, 7d to 8½d.

Hides and Skins.

Hides.—Superior sun dried, 6¾d to 7d; damaged, 5½d to 6d; salted, 6d to 6¼d.

Sheep Skins.—Sound skins are quoted at 6d to 6¾d; damaged, 4d; average, 5½d to 6d; mixed parcels, 4½d to 5½d.

Goat Skins.—Sound skins, 5d to 6d; average, 4d to 5d.

Angora Skins.—Sound, 5d to 6d; damaged, 2½d.

The Oversea Maize Market.

THE POSITION IN OCTOBER.

The following information regarding the oversea maize market in October has been compiled from *Beerbohm's Evening Corn Trade List*:—

Week Ended October 4th.

During this week maize values further rather improved, partly in sympathy with the firmness in wheat and partly owing to the smaller shipments, but there was no activity in the demand.

Advices concerning the Roumanian crop continued very unfavourable. The official indication during the week under review was for a crop not much exceeding five million quarters, against 14,700,000 quarters last year; in other words, this season's production looks like being less than the ordinary annual consumption, so that stocks of old corn carried forward may be required to supply the deficit. From America the crop reports were rather more favourable; but there appeared no doubt that both the maize and oats crops in America this year will show large deficiencies compared with last year. One correspondent of the *Corn Trade List,* in fact, remarks that for the first time for a good many years the maize crop is a partial failure in both America and Europe, and as the price of wheat is evidently going to rule at 40s. to 45s., the value of maize ought to reach 30s. to be in proper proportion.

The speculative demand for maize improved decidedly during the

WEEK ENDED OCTOBER 11TH,

and prices had advanced about 1s. per quarter. The continued very unfavourable reports regarding the Roumanian crop, and the difficulty of buying old corn there, added to the official indication that the American crop is 475 million bushels less than last year, have, it is stated, combined to bring home to buyers that maize, like wheat, and partly in sympathy with that article, is likely to be very dear before many months are past.

Argentina continued to "exceed all expectations" in the matter of maize exports. It was considered not at all improbable, however, that these shipments will come to an end much earlier than is usual, as there is no doubt that the high prices obtainable have attracted a large proportion of the surplus this season at an earlier date than usual.

WEEK ENDED OCTOBER 18TH.

With relatively small shipments to Europe the previous week and continued very unfavourable crop reports from South-Eastern Europe, prices of maize were further decidedly advanced this week, but the demand was evidently checked thereby. Up to 29s. per 480 lbs. was paid for Dan-Gal-Fox steamer afloat, and 28s. 9d. for 20 Oct.-Nov. shipments of La Plata. Argentina again made a relatively good shipment during the week; but for distant shipments there were very few sellers, and there was considered to be little doubt that the surplus was rapidly coming to an end.

During the

WEEK ENDED OCTOBER 25TH

there was a very poor demand for maize, and prices gradually gave way—not because of any pressure to sell, but rather owing to sheer absence of demand. There were no sales of cargoes. In Mark Lane spot values declined about sixpence per quarter on the week, with a poor demand, although supplies were by no means large.

Crop reports from Roumania remained very unfavourable. The preliminary official estimate of the crop was 7,250,000 quarters, against 16,000,000 quarters last season; but the *Corn Trade List's* Ibrail correspondent, writing on the 21st October, did not believe that even this total would be reached, his opinion being that there would be very little exportable surplus. The home requirements of Roumania were, indeed, placed at about 6,000,000 quarters. The *List's* correspondent added that the new corn was arriving in very poor condition, and that consequently it would be dangerous to ship even with a good admixture of old maize.

STATISTICS.

With very little maize forthcoming from Roumania, and very little also from America until next January, the Argentine supplies in the next three months will naturally become a very important factor. Usually by the end of October 70 to 80 per cent. of the total surplus has been exported from that country; this season, owing to the very attractive prices, the proportion is doubtless over 80 per cent. The actual shipments in the past five years from May 1st to October 31st compare as follows, with the total for the season:—

Argentine Maize Export.

	May 1 to Oct 31. Qrs.	Total for Season. Qrs.
		(Estimated.)
1907/08	4.575 000	5.500,000
		(Actual.)
1906/07	8,750,000	12 000 000
1905/06	7,900,000	10,150,000
1904/05	7,765.000	11,390 000
1903/04	7,510 000	10,220 000
1902/03	4.500,000	5.220 000

The general statistical position of maize on the 25th October was as follows:—

	1907—qrs.	1906—qrs.	1905—qrs.
On passage to U.K.	955,000	770,000	510,000
" " Cont.	530,000	1,020,000	690,000
Imports into U.K. for the 42 weeks ending Oct 19	10,039,000	9,060,530	9,052,600
Visible supply in U.S. (*Bradstreet's*) ...	1,135,000	856,900	718,000
	1906-7	1905-6	1904-5
American crop	340,000,000	316,000,000	285,000,000
	1907.	1906.	1905
New York, Spot	71c	55c	62c
Mark Lane, La Plata landed	27/9	20/9	24 9

Shipments of Maize to Europe from January 1st to Date.

	1907. U.K.*	1907. Cont.	1906. U.K.*	1906. Cont.	1905. U.K.*	1905. Cont.
	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.
America	3,380,000	3,926,000	3,634,000	5,741,000	4,225,000	5,310,000
Argentine	3,186,000	1,763,000	4,882,000	4,120,000	5,463,000	3,108,000
Russia	1,399,000	1,983,000	170,000	286,000	220,000	512,000
Danube, etc. ...	2,225,000	3,678,000	444,000	1,168,000	132,000	140,000
Total ...	10,190,000	11,350,000	9,130,000	11,315,000	10,040,000	9,070,000

* Includes shipments for orders.

Coal and Labour Return.

Return of Coal raised and Labour employed at the Natal Collieries for the month of October, 1907 :—

Name of Colliery.	Average Labour Employed.									Output.	
	Above Ground.			Below Ground.			Unproductive Work.*				
	E.	N.	I.	E.	N.	I.	E.	N.	I.	Tons.	Cwt
Natal Navigation ..	34	83	269	22	331	240	4	12	4	26,348	6
Elandslaagte	20	22	296	19	205	478	2	1	3	17,500	2
Durban Navigation ..	26	182	52	10	366	67	—	—	—	15,010	0
Glencoe, Natal ..	13	115	85	11	498	17	—	—	—	14,534	9
Dundee Coal Co. ..	20	11	227	14	58	348	1	1	21	14,020	0
South African	11	10	135	12	230	26	5	27	24	13,647	9
St. George's	17	103	103	12	214	151	3	10	—	13,045	0
Natal Cambrian ..	15	44	175	9	301	89	6	8	2	12,002	2
Newcastle	10	41	25	8	288	2	11	3	—	7,324	11
Ramsay	4	12	52	4	76	105	2	5	10	3,251	5
Natal Steam Coal Co. ..	4	46	5	2	175	5	—	5	1	3,102	11
West Lennoxton ..	5	3	63	2	28	105	—	—	—	2,760	5
Central	5	62	7	7	205	12	2	6	—	2,498	13
Talana (Natal) ..	6	13	26	3	42	80	1	2	1	2,154	14
Zululand†	6	59	—	4	55	—	4	4	—	1,276	6
Ballengeich	1	10	2	1	10	—	13	80	11	34	4
Nooitgedacht	1	1	—	1	3	—	—	—	—	4	0
Dumbi Mountain ..	1	1	—	—	—	—	—	—	—	3	0
Totals	199	818	1,522	141	3,085	1,725	54	164	77	148,516	17
Corresponding month, '06	150	727	1,259	122	2,702	1,529	58	220	276	116,964	13

* Cost charged to Capital Account. † Includes September Return.

Maritzburg,
7th November, 1907.

CHAS. J. GRAY,
Commissioner of Mines.

Return of Coal bunkered and exported from the Port of Durban for the month of October, 1907 :—

	Tons.	Cwt
Bunker Coal*	71,206	4
Exported to :—		
East London	2,368	7
Algoa Bay	8,873	1
Cape Town	20,615	11
Buenos Ayres	3,307	2
Bombay	2,963	7
Mauritius	104	15
Penang	1	0
Singapore	1	0
London	0	12
Total	109,440	19

* Including 2,518 tons 1 cwt. taken by H.M. Warships and Transports.

Custom House, Port Natal,
1st November, 1907.

W. L. HOWE,
for Collector of Customs.

Manures on the Natal Market, Season 1907.

NAME OF MANURE.	NITROGEN.		PHOSPHORIC ACID.								POTASH.		Estimated Total Value of Manure per Ton (2,000 lbs.)	Price asked per Ton of 2,000 lbs. f.o.r. Durban.
			Water Soluble.		Citrate Soluble.		Citrate Insoluble.		TOTAL.					
	Per Cent.	Value in One Ton of Manure.	Per Cent.	Value in One Ton of Manure.	Per Cent.	Value in One Ton of Manure.	Per Cent.	Value in One Ton of Manure.	Per Cent.	Value in One Ton of Manure.	Per Cent.	Value in One Ton of Manure.		
Nitrogenous :		£ s. d.		£ s. d.		£ s. d.		£ s. d.		£ s. d.		£ s. d.	£ s. d.	£ s. d.
Sulphate of Ammonia ...	20·73	16 1 4	...	...	...	...	...	...	...	...	...	...	16 1 4	16 12 6*a*
Nitrate of Soda	16.06	12 14 3	...	...	...	...	...	...	...	...	...	...	12 14 3	12 15 0*a*
do. do.	16·02	12 13 8	...	...	...	...	...	...	...	...	...	...	12 13 8	12 10 0*b*
do. do.	15·51	12 5 7	...	...	...	...	...	...	...	...	...	...	12 5 7	12 4 6*c*
Nitrate of Potash	13·58	10 15 0	...	...	...	...	...	...	...	...	44·47	12 4 7	22 19 7	21 0 0*b*
"Nitrate of Lime"	17·35	13 8 11	...	...	...	...	...	...	...	...	...	...	13 8 11	... *b*
Mainly Phosphatic:														
Superphosphate (Double)	...	...	39·76	11 2 0	2·82	0 11 9	0·34	0 0 11	42.92	11 14 8	...	...	11 14 8	12 0 6*d*
Superphosphate (High Grade)	...	...	17·50	4 17 9	1·52	0 6 4	0·22	0 0 7	19·24	5 4 8	...	...	5 4 8	5 4 6*e*

Superphosphate (High Grade)	...	...	17·35	4 16 10	1·01	0 4 3	0·10	0 0 3	18·46	5 1 4	...	...	5 1 4	5 5 0*b*
Superphosphate	...	...	16·01	4 8 7	1·23	0 5 2	0·51	0 1 5	17·75	4 15 2	...	...	4 15 2	4 17 6*f*
do.	...	...	13·74	3 16 9	2·05	0 8 7	0·96	0 2 8	16·75	4 8 0	...	...	4 8 0	... *g*
Bone Flour (Steamed)	1·37	0 15 9	...	...	9·05	1 17 9	23·83	3 5 6	32·88	5 3 3	...	..	5 19 0	6 0 0*b*
Bone Ground ...	4·05	2 6 7	...	...	4·15	0 17 4	20·41	2 16 1	24·56	3 13 5	...	..	6 0 0	6 0 0*b*
do. do. ...	3·99	2 5 11	...	...	5·64	1 3 6	17·97	2 9 5	23·61	3 12 11	...	...	5 18 10	6 4 2*h*
Basic Slag ...	...	...	...	...	8·65	2 3 3	9·31	1 14 11	17·96	3 18 2	...	...	3 18 2	3 19 6*c*
Potassic:														
Muriate of Potash	...	...	...	...	...	...	...	...	...	...	60·32	14 1 6	14 1 6	13 10 0*b*
Muriate of Potash	...	...	...	...	...	...	...	...	...	...	57·80	13 9 9	13 9 9	13 15 0*a*
Sulphate of Potash	...	...	...	...	...	...	...	...	...	...	50·72	13 19 0	13 19 0	13 15 0*a*
Sulphate of Potash	...	...	...	...	...	..	...	...	...	...	50·61	13 18 4	13 18 4	13 10 0*b*
Nitrate of Potash	13·58	10 15 0	...	...	...	...	...	...	...	...	44·47	12 4 7	22 19 7	21 0 0*b*
Kainit ...	...	...	...	...	...	...	...	...	...	...	12·65	2 19 0	2 19 0	2 17 6*c*
Complete:														
Potato	2·68	2 1 2	7·52	2 2 0	3·35	0 14 0	2·48	0 6 10	13·35	3 2 10	3·71	0 17 4	6 1 4	7 12 0*e*

Names of Sellers.—*a*—Henwood, Son, Soutter & Co. *b*—South African Fertilizers Co. *c*—Steel, Murray & Co. *d*—F. & G. Reiche. *e*—J. Raw & Co. *f*—W. Dunn & Co. *g*—Natal Chemical Syndicate, Ltd. *h*—H. C. Foss & Co., Ladysmith.

Return of Farms at Present under Licence for Lungsickness and Scab.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
A. P. Craw	Ladysmith	Scab	W. Anderson	Netherby
		,,	Jimze	Rossboom
		,,	Mapelwana	Roodepoort
		,,	W. M. Buys	Ruit Kuil
		,,	F. Colling	Klipdal
		,,	F. T. Hyde	Himsley
		,,	H. N. Nel	Catharine
		,,	Ingetenga	Roodepoort
		,,	J. van de Bosch	Ruther Glen
		,,	C. F. Marais	Ontekena
		,,	H. Dicks	The Cave
		,,	Mrs. W. Gibson	Breezie Braes
J. R. Cooper	Nkandhla & Nqutu	,,	Strinera Ka Yabya	Tilizi Hill
		,,	Kinisenika Makwangqa	Selutshana
		,,	Legudhla Mnti	Nqutu Hill
		,,	Gadaleni Chief	Sandheawana
		,,	Makuba Uilife	Haladu
		,,	Menezi Kamadagata	Kwondekca
		,,	Boy Ka Matato	Nqutu Loot
		,,	Peli	Nqutu
		,,	Lerazake Leputza	Mafethling
		,,	Abela Kuzeizili	,,
		,,	Nsinango Butelezi	Selutstana
		,,	Sekwata Ngobeze	Nqutu
		,,	Lepondo and others	Hlazagaza
		,,	Madwo and others	,,
		,,	Guzi Ka Mfeka	,,
		,,	Lekemga	,,
		,,	Mpitipiti	Sandheawana
		,,	Dakasele	Selutyema
		,,	Somtomo Ngobeze	Malagato
		,,	Dabeni Mqube	Moweni
		,,	Jabez Mbata	Nqutu Town
		,,	Albert Selepe	Magubeni
		,,	Leyarha Sondetzi	Nkandi
		,,	Letuza Mlefe	Ncenceni
		,,	Letuza Mlefe	Haladu
		,,	Lunwyiza Sondelzi	Nkandi
		,,	Kanyiza Ntombelha	Magogo
		,,	Mishaki Butelzt	Nqutu
		,,	Mbanko Dubenzana	Telezi Hill
		,,	Mhlawafa Mhlobo	Mkanjaio
		,,	Lefablaselepe	Nqutu
S. A. Brown	Underberg	,,	J. A. Stone	
		,,	T. de C. Arbuckle	Kerridge
		,,	B. Phipson	Strathcampbell
		,,	M. Fraser	Winterhoek
		,,	R. C. Gold	Woodend
		,,	J. R Royston	Greenend
		,,	J. van Whye	Silburn
		,,	F. A. Hathorn	Sauguana
		,,	T. Palframan	Slogoma
A. B. Koe	Portion of Estcourt	,,	J. J. B. Cooke	Estcourt
		,	F. R. Moor	Greystones
A. J. Marshall	Dundee	,,	R. J. du Bois	Giba
		,,	J. W. de Bruyns	Rooifontein
		,,	C.M. & T.C Vermaak	Paddock & Harriotdale
		,,	C. J. Pieters	Zwaartwater
		,,	P. J. Meyer	Kilburn
		,,	A. Date	Kemperweldt
		,,	C. P. Cronje	Kilburn
E. Varty	Western Umvoti	,,	C. A. Charlwood	Craigieburn
J. J. Hodson	Ptn of Lion's River	,,	W. A. Dales	Gowrie
		,,	G. Woodhouse	Halliwe
		,,	G. H. Burgmann	Boschhoek

RETURN OF FARMS AT PRESENT UNDER LICENCE FOR LUNGSICKNESS AND SCAB—*continued.*

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
R. Mayne ..	Krantzkop ..	Lungsickness	Maqamganse ..	Loots Hoek
		,,	Uqupu	Myoniezwe's Locat'n
		,,	Ndabane .. .	,,
		,,	S. Johnson & Co. ..	Inadie Store
		,,	Ndabane	Myoniezwe's Locat'n
		,,	Natives	Myoniezwe's Locat'n
		,,	Amosi	
A. H. Ball	Weenen	Scab	Vunyo and others..	Elena Berg
		,,	L. J. & T. C. Lotter	Waterfall
		,,	S. C. Van Rooyen. .	Middleburg
		,,	A. & M. Lotter ..	Waterfall
		,,	C. P. F. Lotter ..	,,
		,,	D. Huyser ..	Bird Spruit
		,,	J. L. Fourie ..	Scottshoek
G. Daniell ..	Vryheid ..	,,	Nkanyeze.. ..	Mooiplaats
		,,	Mtolie	Beaufort
		,,	Zimbata	Nooitgedacht
R. Mayne ..	Eastern Umvoti ..	Lungsickness	Nkabi and others	Loots Hoek
		Scab	P. Mare	Speculation
J. Button	Portion of Estcourt	,,	J. Phipps	Littlecote
E. Parkinson ..	New Hanover ..	,,	Ndabeni and Jim ..	Location
		,,	W. J. Dickens ..	Laager Farm
D. M. Pfaff ..	Utrecht	,,	B. J. J. Human ..	Weltevreden
J. Stewart ..	Bergville ..	,,	J. Bester	Abergeldie
		,,	J. Lawford ..	Mt. Hilda
		,,	G. L. Coventry ..	Earby
		Lungsickness	G. W. Horton ..	Hortonradford
		,,	Macomfi	Woodford
		,,	Lunaba	Hortonradford
R. Wingfield Stratford	Newcastle ..	Scab	J. H. Muller ..	Leyden
		,,	C. Friend ..	Lilydale
		,,	J. van Niekerk ..	Pomeroy
		,,	J. de Wet. . ..	Schuinhoogte
		Lungsickness	Umlozi	Vrede
J. G. Speirs ..	Impendhle ..	Scab	Pinda, Vete & Sobuon	Furth
A. Brown ..	Polela	,,	Mahlali ..	Stoffletown
		,,	F. J. Livingstone . ,	Fernbank
		,,	H. Cole	Cameron
		,,	P. J. Venter ..	Everfair & Springholmes
L. Trenor ..	Harding	Lungsickness	Madunckana ..	Tridale
		,,	Yanyan	Mlo'shwa
		Scab	F. C. Young ..	Winterhoek
C. T. Vaughan , .	Paulpietersburg ..	,,	J. D. Van Colles ..	Schurweberghoek
B. Klusener ..	Port Shepstone ..	Lungsickness	G. Daddy. . ..	Sugar Bush Cutting
		,,	Mbontshe. . ..	Isotsha

MANGE IN HORSES EXISTS AS UNDER.

Name.	District.	Name.	District.
Nseleni	Markwa Mountain.	Genegwa	Polela, Location No. 2
Abbott Bros.	Mooi River		

Mr. Luther Burbank recently packed a box of seventy-three varieties of apples, all picked from one tree. He uses the various varieties in cross-breeding experiments.

Meteorological Returns.

Meteorological Observations taken at Government Stations for Month of October, 1907.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.).				RAINFALL (IN INCHES).					
	Means for Month.		Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heav'st rainfall in 1 day.		Total for Year from July 1st, 1907.	Total for same per'd from July 1st, 1906.
	Maximum	Minimum					Fall.	Day.		
Observatory ..	74·2	59·7	83·5	52·8	4·56	18	·87	5th	7·62	11·72
Stanger ..	77·4	58·2	102	50	3·36	18	1·02	29th	7·40	11·38
Verulam ..	83·3	60·3	101	52	3·51	14	1·52	24th	7·10	11·00
Greytown ..	74·5	45·5	95	35	4·44	17	1·24	28th	6·91	6·11
Newcastle .	78·1	51·1	100	42	5·00	12	·93	28th	7·83	9·51
Ndwedwe ..	70·7	56·4	84	47	4·26	18	1·80	25th	7·77	10·50
Estcourt ..	79·4	48·1	96	40	4·25	11	1·65	2nd	5·55	5·23
Bulwer ..	—	—	—	—	3·69	17	·96	24th	7·44	—
Camperdown ..	74·0	50·5	96	41	3·36	14	·65	25th	5·36	8·12
Mid-Illovo ..	72·5	51·8	95	42	3·44	17	·64	30th	6·87	10·82
Port Shepstone	74·4	51·6	82	41	2·76	14	·76	29th	5·47	11·81
Richmond ..	72·8	50·1	99	40	3·66	16	·39	24th	7·16	7·80
Maritzburg ..	75·8	51·9	103	45	3·40	19	·63	22nd	6·03	8·66
Howick ..	74·3	48·9	97	39	2·65	17	·79	24th	5·71	8·46
Dundee ..	77·6	52·1	99	43	3·93	11	1·00	28th	6·91	6·76
Weenen Gaol ..	82·6	51·0	103	42	2·43	15	·40	28th	4·17	5.33
Impendhle ..	74·6	39·8	92	30	2·83	12	1·14	23rd	6·08	5·95
New Hanover ..	78·0	49·6	99	40	5·25	15	2·05	24th	8·77	10·36
Charlestown ..	70·6	44·9	90	35	4·18	15	·95	30th	5·74	7·28
Nongoma ..	75·4	44·5	86	39	4·05	11	1·05	28th	6·37	10·75
N'Kandhla ..	73·6	38·6	89	35	3·15	8	1·10	9th	6.24	9·42
Ingwavuma ..	72·4	54·6	95	46	5·22	13	1·40	28th	6·88	—
Mtunzini ..	77·9	56·1	95	38	6·54	17	2·25	25th	13·33	—
Hlabisa ..	77·0	56·9	89	50	6·71	10	1·00	4th	10·96	10·85
Melmoth ..	75·4	53·2	95	44	2·92	16	·61	25th	5·38	10·28
Ubombo ..	79·8	57·5	90	50	4·62	13	1·60	29th	6·64	12·10
Nqutu ..	74·5	49·8	95	41	3·63	17	·53	28th	5·51	—
Point ..	—	—	—	—	4·03	14	·86	4th	7·86	13·07
Vryheid ..	76·9	50·5	97	41	4·23	15	1·22	29th	7·61	7·30
Mahlabatini ..	76·6	46·5	92	40	4·98	11	1·60	28th	6·88	7·85
Empangeni ..	77·2	57·2	95	50	4·29	13	1·20	24th	8·24	9·17
Utrecht ..	83·2	35·7	102	28	5·08	11	·88	4th	6·48	—
Amatikulu ..	81·4	58·2	105	47	2·53	15	·45	29th	4·67	8·40

Meteorological Observations taken at Private Stations for Month of October, 1907.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.)		RAINFALL (IN INCHES).					
	Minimum for Month.	Maximum for Month.	Total for Month.	No. of Days.	Heaviest rainfall in 1 day.		Total for Year from 1st July, 1907.	Total for same period from July, 1906.
					Fall.	Day.		
Harden Heights	—	—	3·40	12	1·42	25th	5·80	—
Riet Vlei	—	—	3·89	12	1·03	2nd	5·94	5·02
Dalton	—	—	3·70	15	1·12	24th	6·39	2·87
Nottingham Road	—	—	4·42	16	·96	24th	7·78	—
Giant's Castle	72·8	46·2	2·95	15	·78	25th	5·15	—
Adamshurst (Wm. Adams) ..	92	44	2·80	12	·61	22nd	4·91	—
Hilton	94	42	3·06	16	·70	24th	6·04	9·67
Branxholme	—	—	8·03	17	2·50	24th	11·93	11·7
Cedara—Hill	91	39	2·50	13	0·50	24th	4·65	8·12
,, Vlei	96	36·5	2·02	14	0·57	24th	4·34	7·89
Winkel Spruit..	81	50	2·59	9	0·75	29th	7·94	11·91
Weenen	96	39	2·15	11	0·38	28th	—	—
Ottawa	—	—	3·18	11	1·20	25th	5·98	—
Mt. Edgecombe (Natal Estates)	—	—	3·41	14	1·12	25th	7·25	13·50
Cornubia ,, ..	—	—	3·78	—	—	—	7·60	15·0
Milkwood Kraal ,, ..	—	—	3·05	—	—	—	5·96	11·58
Blackburn ,, .	—	—	3·30	—	—	—	7·06	11·06
Saccharine ,, ..	—	—	3·36	—	—	—	6·76	11·85
Equeefa (W. Hawksworth) ..	90	53	3·54	12	0·68	1 & 30	6·45	18·11
Umzinto, Beneva	—	—	2 67	11	0·57	29th	5·43	17·92

Pound Notices.

NOTIFICATION is contained in the *Government Gazette* of the sale, unless previously released, of the undermentioned live stock on the dates specified :—

ON THE 4TH DECEMBER.

Mooi River—Brown Kafir goat ram, swallow tail right ear, no brand. Probable value, 10s. Impounded on the 1st November by Mr. J. A. Skottowe.

ON THE 11TH DECEMBER.

Finchley (Ixopo Division)—Bay horse (rigg), black points, right ear swallow tail, old marks of very bad sore on withers, deep dent on near side of neck. Probable value, £7 10s. Impounded on the 6th November, 1907, by Dungundungu, of Lena Vale.

Woodstock (Bergville Division)—Dark bay stallion, about 14 hands, nick out of back of right ear, white star on forehead, white splash above left nostril, right hind foot white, long mane, had headstall and hobbling reim on. Probable value, £10. Impounded on the 2nd November by E. M. Richardson.

ON THE 18TH DECEMBER.

Creighton—(1) Black ewe goat and kid. (2) White ewe goat. (3) White ewe goat, black patch on head.

Finchley (Ixopo Division)—(1) White hog, four white feet. (2) Two brown and black spotted pigs, sows. (3) Black and white spotted pig, boar. (The last three pigs are about two months old or less.) (4) Sheep, ewe, nick in front of right ear. (5) Sheep, ewe, slit in right ear ; with ram lamb. (All three branded G on right side.)

Gourton—Black ox, about 5 years old. (Running at a native's kraal on farm "Bergvliet" since 21st October, and reported by Mr. H. Oellermann as too wild to be driven to the Gourton Pound.)

Greytown—Running on Mr. T. J. Nel's (M.L.A.) farm "Craiglands," and reported by him as being too wild to be driven to the Pound : (1) Iron grey mare, 2 years old. (2) Chestnut mare, 2 years old, small star on forehead. (3) Chestnut mare, no marks, 2 years old. No marks or brands on any of the foregoing. (4) Running on Mr. P. R. Botha's farm "Olivefontein," and reported by him as being too wild to be driven to the Pound : Young ox, black and white, no brand, right ear mark swallow tail, and half moon at back of ear, no brand.

Howick—She-goat, black, brown and white, right ear swallow tail, no brands.

Ingogo—Horse, dark bay, blind in left eye, white star on forehead, marked with white hair on back, seems to have had a sore back.

Ladysmith—(1) White Africander sheep, hamel, small horn on the right. (2) Red Africander sheep, ewe, small thin horns, left ear nicked. (3) Dun and white Africander sheep, ewe, right ear slit at back. (4) Two brown and white Africander sheep, ewes, ears marked with pieces taken out of under side.

Mtunzini—(1) Brown mule, mare, branded R near shoulder, circle with radiating lines on near hind quarter. (Impounded by a native on the 26th October.)

Nqutu—(1) Bay gelding, about 13.2, flea-bitten, branded 51 off hind quarter, shod fore feet, short mane. (2) Black cow, Zulu, half moon cut out right ear, cast in left eye. (3) Black heifer calf, fourteen days old. Nos. (2) and (3) reported by Mr. F. Mervyn Peters. Running on farm "Morton," Nqutu Hill, and unable to move owing to East Coast Fever restrictions.

ON THE 2ND JANUARY.

Gourton—(1) Running on the farm "Doveton," and reported by Mr. R. J. Lund as too wild to be driven to the Pound : Old red cow, with forward horns, appears to have had her left hind leg broken at some time, indistinct brand on right hip, looks like E.P. (2) Young red ox, about 2 years old, no brands, V shape cut out of right ear, and the tip cut off left ear.

Hatting Spruit—(1) Blue-grey gelding, 6 years, 14 hands, branded M.C. near side. (2) Iron-grey gelding, 5 years, 14 1 hands, no brands.

Ndwedwe—Black he-goat, age about 2 years, no brands, no horns. Impounde by Chief Mandhlakayise, Inanda Division, on the 30th October, 1907.

New Germany—Dark brown donkey, long hair, long tail, poor in condition and old.

Thornville Junction—Dark brown (approaching grey) gelding, bles, branded A. L. near shoulder, white socks near fore and off hind feet, shod all round.

IMPENDHLE POUND.

The Pound at Impendhle, which was recently abolished, has been temporarily re-established for the purpose of dealing with certain animals now therein. Mr. J. W. Brooke has been appointed keeper thereof.

Diamond Drilling.

SOME of the departmental diamond drilling plants are at present disengaged and available for hire for boring for either minerals or water. Particulars as to terms of hire may be obtained from the undersigned.

CHAS. J. GRAY,
Commissioner of Mines.

Employment Bureau.

THE Department of Agriculture has received applications from the undermentioned, who are prepared to become assistants or apprentices on farms. The Department will be glad to hear from farmers willing to take young men as assistants, and to place them in correspondence with the various applicants. When communicating on the subject, farmers may refer to the applicants by quoting the numbers in the following list:—

No. 91a.—Scotchman, 42, seeks management of stud. Life experience as tenant farmer in south of Scotland, breeding, rearing, breaking and showing Clydesdales, hackneys, and half-breds. Has bought horses in Ireland and taken charge of them on board ship and while on rails. References and testimonials.

No. 97a.—Colonial, aged 22, bricklayer by trade, speaks Zulu, Dutch, and Hindustan, desires employment as a farm hand. Was on a farm in vicinity of Pretoria for six months.

No 100.—Englishman, 23, with experience gained in Richmond district, desires to get on to farm further up country. States he is active and not afraid of work. Wage no particular object.

104a.—Yorkshireman, 36 years of age, seeks position as manager of a farm. English and Colonial experience. Was at one time manager of an experiment station. Good references. Married.

105a.—Boy, 17, English, desires employment on a farm.

106a.—Colonial, aged 24, bricklayer by trade, desires situation on a farm. Steady and reliable, with a few months' experience of farming.

107a.—About 45 years of age, who has held positions of responsibility on the N.G.R. and Rhodesian Railways, desires employment. Produces good references.

109A.—Scotchman, 39 years of age, producing good references from his previous employers, desires to obtain on a farm light work, such as bookkeeping, superintending despatch of produce, &c.

Farmers requiring good, steady farm hands would do well to communicate with Ensign Anderson, of the Salvation Army Shelter, Maritzburg, who constantly has good men at the Shelter who would be glad of employment at reasonable rates. Ensign Anderson pledges himself not to recommend for employment any but those he is satisfied will give satisfaction to their employers. He will be pleased to enter into correspondence with any farmer who may address him on the subject.

Executives of Farmers' Associations.

ALFRED COUNTY FARMERS' ASSOCIATION.—President: A. G. Prentice, J.P. Vice-Presidents: C. Knox, J.P., L. T. Trenor, and C. A. Holwell. Hon. Secretary and Treasurer: H. C. Hitchins. Committee: C. M. Etheridge. R. Fann, J.P., V. Hitchins, S. Aitchison, J.P., W. B. Rethman, Dr. Case, J.P, H. Rethman R. G. Mack, J. Hogg.

BOSTON FARMERS' ASSOCIATION.—President: Thomas Fleming. Vice-President: J. Geldert. Hon. Secretary and Treasurer. W. J. Fly.

CAMPERDOWN AGRICULTURAL SOCIETY.—President: John Moon, J.P. Vice-Presidents: J. Gavin and John W. Harvey, J.P. Hon. Secretary: W. E. Allsopp.

CAMPERDOWN AND DISTRICT FARMERS' ASSOCIATION.—President: John Moon, J.P. Vice-President: F. N. Meyer. Hon. Sec.: J. Baker. Committee: H. Baker, J. Gavin, J. W. Harvey, J.P., W. B. Turner, H. H. Hutton, C. Baker, H. E. Meyer.

DUNDEE AGRICULTURAL SOCIETY. — President: F. Turton, J.P Vice-Presidents: The Minister of Agriculture, the Mayor of Dundee, Messrs. A. L. Jansen, H. Wiltshire, and T. P. Smith. Hon. Secretary and Treasurer: J. McKenzie. Committee: D. C. Pieters, D. Macphail, M. Taylor, A. W. Smallie, W. Craig, C. G. Willson, D. G. Smith, A. Grice, W. J. H. Muller, E. G. Woblitz, G. M. de Waal, B. J. Humann, W. H. Doidge, R. Retallack, H. Ryley, H. J. Head. A. S. Pieters, R. R. Mortimer, C. Vermaak, A. E. Norman, W, V. Marshall, H. P. Handley, J. Dyson, T. J. Harvey.

DURBAN COUNTY FARMERS' ASSOCIATION.—Patron: J. H. Colenbrander. President: J. McIntosh. Vice-Presidents: H. Westermeyer, R. R. McDonald. Committee: F. R. W. Bœhmer, G. Compton, H. Freese, W. Freese, W. Gillitt, H. W. Kœnigkræmer, H. W. Nichols, F. Schæfermann. Hon. Sec. and Treasurer: Frank J. Volek.

ESHOWE DISTRICT FARMERS' ASSOCIATION.—President: J. R. Pennefather. Vice-President: C. F. Adams. Secretary: T. Parkins. Treasurer: W. T Brockwell.

GOURTON FARMERS' ASSOCIATION.—President: W. C. Stockil, Esq., J.P. Vice-President: M. Sandison, Esq. Hon. Secretary and Treasurer: Frederick B. Burnard, Esq.

HATTING SPRUIT FARMERS' ASSOCIATION.—President: J. Campbell. Vice-President: A. W. Smallie. Hon. Secretary and Treasurer: R. J. Hearn. Committee: G. Queddon, T. P. Smith, W. A. Helmer, Thos. Brookes, N. Glutz, Wm. Craig, W. R. Quested, J. A. Brookes, W. T. Heslop, Thos. Dewar, F. Turton, W. H. Tatham, A. E. Norman, D. P. Campbell.

HIMEVILLE AGRICULTURAL SOCIETY.—President: Henry C. Gold, Dartford, Polela. Vice-Presidents: W. Little, F. E. Peto, G. Malcolm. Hon. Sec. and Treasurer: G. Palframan, Watermead, Polela. Executive Committee: G. Malcolm, W. S. Johnston, P. McKenzie, W. Little, G. Royston. Yard Steward: H. Brown Auditors: T. C. Dearlove and T. E. Marriott.

HOWICK FARMERS' ASSOCIATION.—Chairman, Thos. Morton; Vice-Chairman, M. A. Sutton; Hon. Secretary and Treasurer, A Clark.

INGOGO FARMERS ASSOCIATION.—President: Angus Wood, J.P. Vice-Presidents: G. A. Fimstone and J. Browning. Hon. Secretary and Treasurer: C. Watt.

IXOPO AGRICULTURAL SOCIETY. — President: W. Arnott. Vice-Presidents: F. L. Thring, J.P., John Anderson, C. E. Hancock, J.P. Committee: W. K. Anderson, J.P., Thos Allen, J. C. Auld, H. D. Archibald, F. S. Beningfield, S. Boyd, F. E. Foxon, R.M., Wm. Foster, Jas. T. Foster, Geo. E. Francis, L. Gray, A. M. Greer, J.P., J. R. Greer, Wm. Gold, Jno. Gold, H. A. Hill, C. F. Harris, A. E. Keith, R. Kennedy, Geo. Martin, W. Oakes, L. J. Phipps, T. F. Remfry, J. W. Robinson, Jas. Schofield, M.L.A., A. Stone, W. R. Way, G. C. Way, A. H. Walker, M.L.A., J. L. Webb (F.R.C.V.S.). Hon. Sec: G. C. Ways. Hon. Ass. Sec.: A. G. Harris. Hon. Treasurer: T. Arnott.

IXOPO FARMERS' ASSOCIATION.—President: A. E. L. Keith, Ixopo. Vice-Presidents: Geo. Martin, Claybrooke, Ixopo; A. Kirkman, Lufafa, Ixopo.

Hon. Secretary and Treasurer: Geo. E. Francis, Morningview, Ixopo. Delegates to Farmers' Union: President and James Foster. Committee: F. Remfry, R. Vause, C. E. Hancock, John Anderson, R. Greer, W. Oakes, D. Campbell, G. C. Way, James Foster.

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ZULULAND COAST FARMERS' ASSOCIATION.—President: G. H Hulett; Vice-President: C. Hill; Hon. Secretary and Treasurer: F. Brammage, Ginginhlovu.

(*The Editor will be obliged if the Hon. Secretaries will supply him with lists of the Executives of their Associations.*)

Purchase of Tree Seeds.

With a view to the encouragement of seed production in the Colony, offers are invited from persons having locally-grown seed of exotic trees for sale. Not less than one pound will be purchased; and a specimen bearing seed vessels or flowers should be sent for identification purposes. Offers should be made in the first instance to the Forester, Cedara.

E. R. SAWER,
Director, Experiment Stations.

Trees for Sale.

To encourage tree-planting, transplants and seeds of forest trees are supplied by Government, so far as in stock, at the undermentioned rates, exclusive of carriage, from the Government Nursery, Central Experimental Farm, Cedara.

Transplants of Eucalyptus, Pines, Acacias, Casuarinas, Cupressus, etc., about 25 trees in each tin, at 8s. 4d. per 100 trees. Trees in separate tins at 1s. each.

Transplants of scarce kinds, larger trees, or surplus stock, when available, will be charged at special rates, which will be furnished on application.

Tree seeds, in variety, at 1s. per packet. Price per pound, which fluctuates, will be furnished on application.

Package and postage of seed, when required, charged 1s. per lb extra.

Orders for present or spring delivery should be addressed to the **Forester, Cedara,** and must be accompanied by a remittance in cash or postal order, Cheques cannot be accepted,

E. R. SAWER,
Acting Conservator of Forests,

East Coast Fever.

SLAUGHTER CATTLE.

THE Department of Agriculture has erected abattoirs adjoining the Government Cold Stores, Maritzburg, where people will be able to forward cattle from clean and infected areas for slaughter. Killing, chilling, and freezing can be undertaken by the Department if desired, and arrangements can also be made for the forwarding by rail of meat intended for sale in markets outside Maritzburg. This will enable farmers, who wish to dispose of their stock for slaughter and find a difficulty in so doing, to have their animals killed in Maritzburg and the meat forwarded to Durban or any other market. The abattoirs will be under the personal supervision of Mr. A. R Burford, the Manager of the Government Cold Stores, who is thoroughly experienced in this particular class of work.

The provisional abattoir charges are :—

Cattle per head		1s., with a minimum of £3 per killing space per month.
Sheep		1½d. each.
Pigs		3d. „
Chilling and Freezing Beef,	1st week	1s. 3d. per qr.
„ „	2nd „	1s. „
„ „	Remaining weeks	9d. „
Sheep	per week	3d.
Pigs	„	6d.

Charges for killing and handling Cattle. and placing same in Cold Storage, if required, or meat to be taken away by customer from hanging-room :—

Cattle, per head	4s. each (including abattoir fee).
Sheep	6d. „
Pigs	1s. „ up to 200 lbs.
„	1s. 6d. each, over 200 lbs. & up to 300 lbs.
„	2s. „ over 300 lbs.

W. A. DEANE,
Minister of Agriculture.

Department of Agriculture, Maritzburg,
9th April 1907.

Cows Wanted.

WANTED urgently, cows just calved or due to calve. Old animals suitable ; any breed.

Apply—P.O. Box 282,
Pietermaritzburg.

Seeds for Distribution.

SEEDS of the following have been secured for distribution to farmers at cost price —Cotton, Sugar Beet, Tobacco, Rice, Lupins and Field Peas, Italian and Perennial Rye Grass, Paspalum and Cocksfoot. Varieties and prices upon application to the Farm Manager, C.X F., Cedara.

E. R. SAWER,
Director, Experiment Stations.

Brands Allotted to Infected Magisterial Divisions.

The following is a list of the brands which have been allotted to the several infected Magisterial Divisions:—Durban County, D. 2; Alexandra County, A. 2; Lower Tugela, T. 2; Mapumulo, S. 2; Inanda, B. 2; Umsinga, U. 2; Dundee, X. 2; Vryheid, V. 2; Ngotshe, H. 2; Paulpietersburg, P. 2; Nongoma, G. 2; Mahlabatini, L. 2; Ndwedwe, N. 2; Weenen County, W. 2; Umvoti, F. 2; Hlabisa, K 2; Eshowe, E. 2; Ladysmith, R. 2; Babanango, O. 2; Ladysmith, East of Line outside infected area, R. 3, Utrecht, Z. 2; Krantzkop, 2 K; Umvoti Location, 2 F.

Fees for Agricultural Analysis.

It is hereby notified that Farmers and others can secure analytical determinations from the Government Laboratory, Central Experiment Farm, Cedara, in accordance with the following scale of fees, which are subject to revision:—

	Scale I.			Scale II.		
FERTILIZERS AND FEEDING STUFFS:	£	s	d.	£	s.	d.
Determination of 1 constituent ...	0	7	6	0	5	0
,, 2 or 3 constituents ...	0	15	0	0	10	0
Complete analysis	1	1	0	0	15	0
SOILS: Partial analysis of a soil in relation to its fertility	1	1	0	0	10	6
Complete analysis of a soil	2	2	0	1	1	0
WATER: Irrigation and drainage ..	1	10	0	0	10	6
VEGETABLE PRODUCE: Fodders, Ensilage, Grains, &c.	1	1	0	0	15	0
MILK, CREAM, BUTTER: Fat only ...	0	5	0	0	2	6
,, ,, : Complete ...	0	15	0	0	7	6
WATTLE BARKS AND TEA: Tannin ...	0	5	0	0	2	6
CATTLE DIPS: Quantitative analysis of 1 to 3 principal constituents	0	10	0	0	5	0
INSECTICIDES:						
Qualitative analysis each constituent ...	0	5	0	0	2	6
Quantitative ,, ,, ,, ...	0	10	6	0	5	0

Scale No. 1 is applicable to samples handed in by Merchants and Dealers, and where trade interests are involved.

Scale No. 2 is applicable to samples forwarded by *bona fide* Farmers and Gardeners.

Samples will be accepted at the discretion of the Department, and must be properly selected and labelled.

The Department reserves the right to publish the results of any analysis and, where such is deemed of sufficient public interest, to remit such charges.

E. R. SAWER,
Director, Experiment Stations.

November 22nd, 1907.

Central Experiment Farm, Cedara.

In order to minimise interference with the general course of work on the Central Experiment Farm, Cedara, it has been found necessary to set apart one day of the week, namely, Friday, as a visitors' day.

Arrangements will accordingly be made on that day for receiving visitors and showing them round the Farm. A trap will be at Cedara Station to meet the up 9.50 a.m. train ; and if intending visitors from up-country will give notice to the guard at Howick Station, on their way down, a trap will be sent to meet the train which passes through Cedara at 11.2 a.m. Visitors travelling by other trains will also be met if they will previously make arrangements by writing.

On other than the visitors' day, visitors may be received by appointment, but special attention cannot be guaranteed in regard to their being shown round.

As the catering involves such a strain upon the resources of the School of Agriculture, it has been decided to limit the number of delegates from any one Association to 25 per cent. of its membership. At least 14 days' clear notice must be given by Associations, so that there may be time to make all necessary arrangements.

In view of the fact that Parliament has refused to grant the necessary funds, the cost of railway tickets can no longer be borne by the Department of Agriculture.

All communications in connection with proposed visits to the Experiment Farm should be addressed to the Director of Experiment Stations, Cedara.

W. A. DEANE,
Minister of Agriculture.

24th September, 1907.

Steam Ploughs.

Applications are invited for the services in the various districts of the Colony of the Steam Ploughs recently ordered by the Government.

Applicants should state clearly the position of their farms, and the total acreage required to be ploughed.

The charges will, for the present, be at the rate of, approximately, 10s. an acre in the Midland and Upland Districts of the Colony, and 15s. an acre in the Coast Districts ; but the Government reserves to itself the right to vary these charges later on when experience has been gained as to the actual cost of working.

Preference will be given to those districts affected by East Coast Fever, and, again, to those from which the greatest number of applications are received.

Applicants will be advised, as soon as possible after the ploughs come to hand, whether the Government will be able to undertake the required ploughing, and when the ploughs are likely to be available.

H. A. HIME,
Acting Under Secretary for Agriculture.

Department of Agriculture, Pietermaritzburg,
25th November, 1907.

Offers are invited for Two 6-Furrow Spalding-Robbins, Stump-Jumping Disc-Ploughs for Steam Traction. These have had little use, and the frames are as good as new, while the Ploughs were fitted with new discs last season. Landed cost of these was £56 each at the Point. Approximate weight, 2,000 lbs.

E. R. SAWER,
Director, Experiment Stations, Cedara.

Rules for Agricultural Co-Operative Societies.

THE Department of Agriculture has for disposal, at the rate of one shilling each, copies of Model Rules for the use of Agricultural Co-operative Societies. Applications should be made to the Acting Under Secretary for Agriculture, Pietermaritzburg.

Bulletins Issued by the Dept. of Agriculture.

Single copies may be obtained free (excepting those with price attached) on application to the Secretary, Minister of Agriculture.

No.
1.—"Notes on Fruit Culture," by Claude Fuller. [1902]. *(Out of print.)*
2.—"Manures on the Natal Market, 1902," by A Pardy. [1902].
3.—"Insects in an Important Rôle," by Claude Fuller. [1904]. *(Out of Print.)*
4.—"Manures on the Natal Market, 1903," by A. Pardy. [1903].
5.—"Weed Circular," by Claude Fuller. [1905].
6.—"Manures on the Natal Market, 1904," by A. Pardy. [1904].
7.—"Tree-planting in Natal," by T. R. Sim. [1905]. *(Price 2s. 6d.)*
8.—"Agricultural Co-operation," by E. T. Mullens. [1905]. *(Out of Print.)*
9.—"Potato Culture" by A. N. Pearson. [1905]. *(Out of Print.)*
10.—"Manures on Natal Market, 1905," by A. Pardy. [1905].
"Agricultural Statistics, Natal, 1904-5." [1906]. *(Out of Print.)*
11.—"East Coast Fever," by S. B. Woollatt. [1906].
12.—"Manures on Natal Market, 1906," by A. Pardy. [1906].
"Agricultural Statistics, Natal, 1905-6." [1907].

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This for several years has been sold in cases of **40** $2\frac{3}{4}$ lb. packets, mixing 1 to 30 gallons water, but to meet the wishes of Farmers regularly using this Dip it will in future be sold in cases containing **48** $2\frac{1}{4}$ lb. packets, mixing, 1st Dipping—1 to 25 gallons water; 2nd Dipping—1 to 50 gallons; thus, while in every way efficient for the eradication of scab, means a considerable saving in the cost of Dipping.

QUIBELL'S PASTE CATTLE DIP.

The popularity of this famous Dip is still maintained. Its reputation for keeping Cattle and Horses in a healthy condition is known to almost every farmer.

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Retains its high standard in germicidal efficiency. One bottle or drum of "Kerol" does the work of 15 bottles or drums of carbolic acid.

It is used by the South African Governments, Municipalities, Hospitals, etc., and should be used in every Home as a preventive against Infectious Diseases, for General Sanitary Purposes, for Kennels, Poultry, Stables, etc.

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PREVENTS HORSE SICKNESS.

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DEAR SIRS, DURBAN, NATAL, *September 11th, 1903.*

I have used your Condition Powder and have found it to surpass anything I had tried. My horses felt the benefit of the Powder before many days, and I find that the use of the Powder for a few days from time to time, keeps them in perfect condition and free from disease of every description.

Yours faithfully, EUGENE RENARD.

* * *

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DEAR SIRS, *September 26th, 1900.*

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You are at liberty to make what use you like of this letter. Yours faithfully, J. J. JOHNS

* * *

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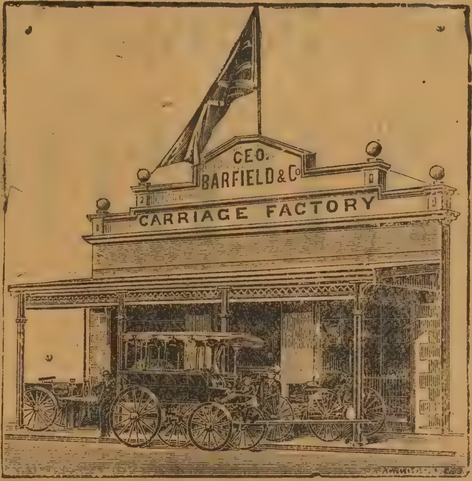

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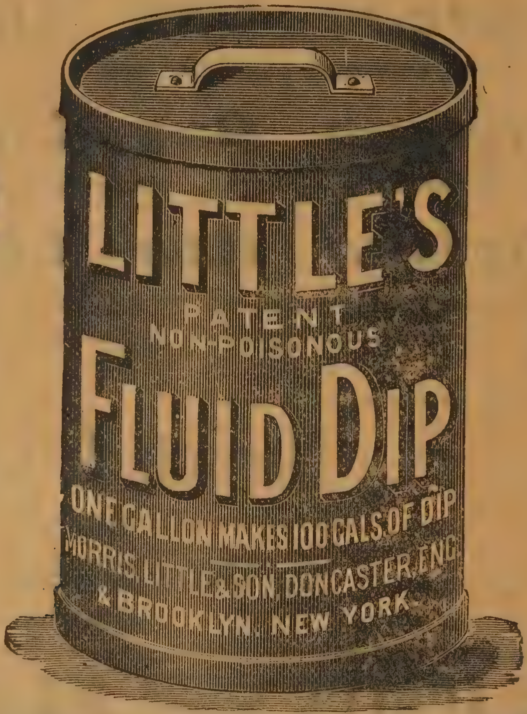
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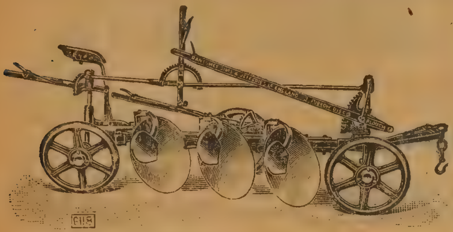
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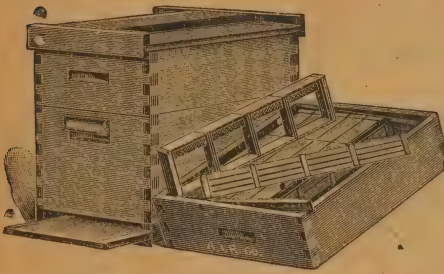
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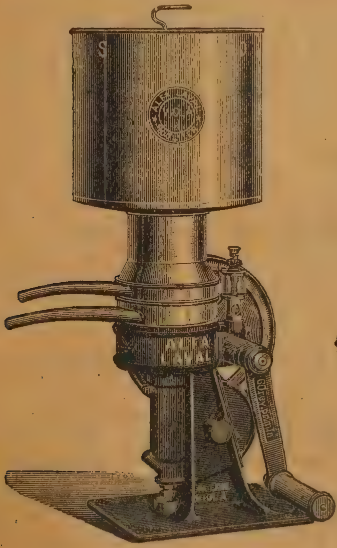
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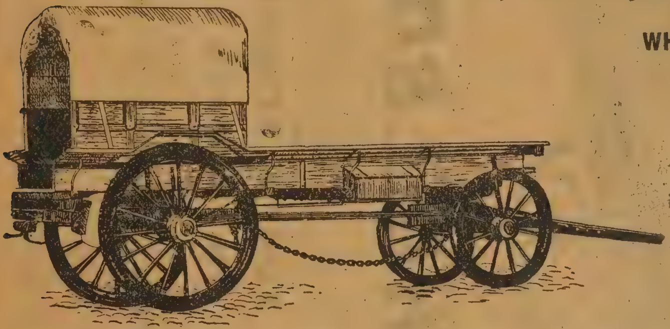

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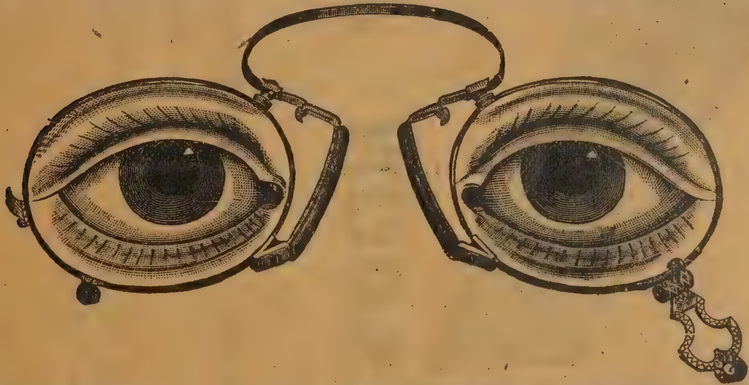

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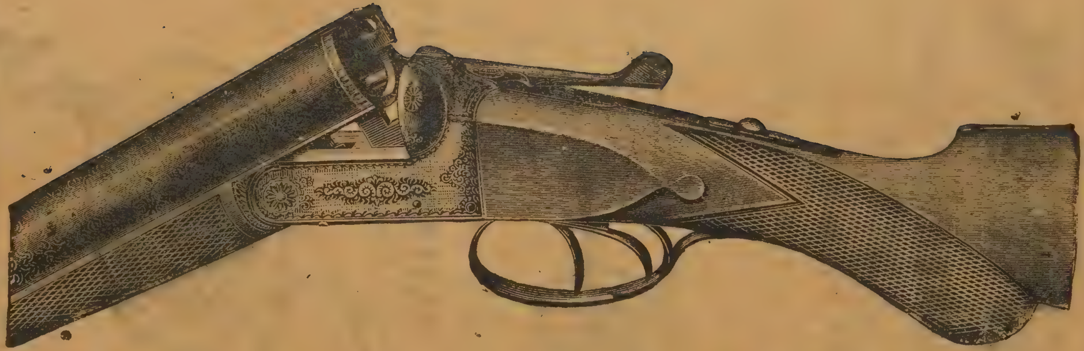

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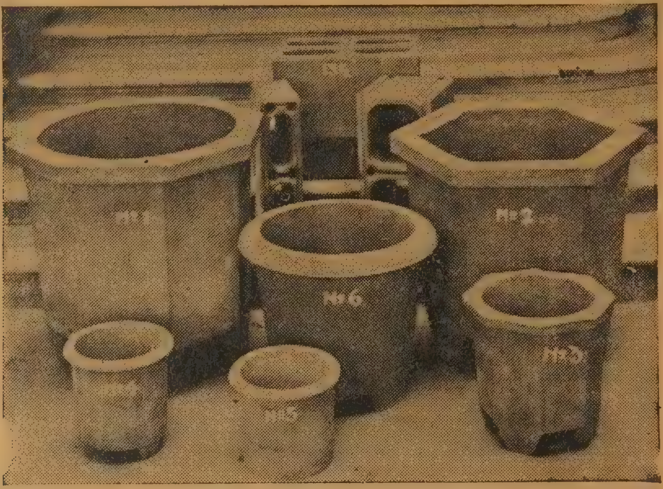

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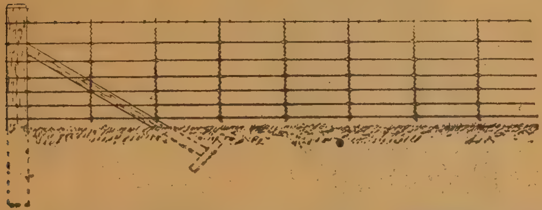

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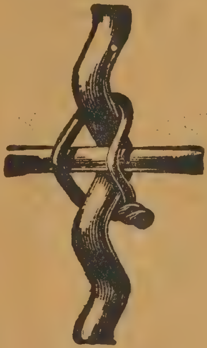

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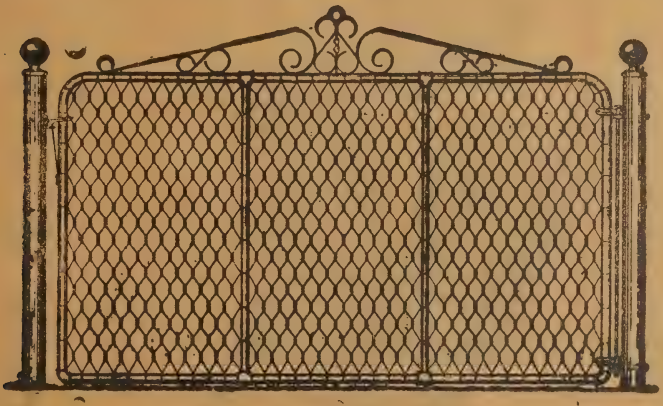

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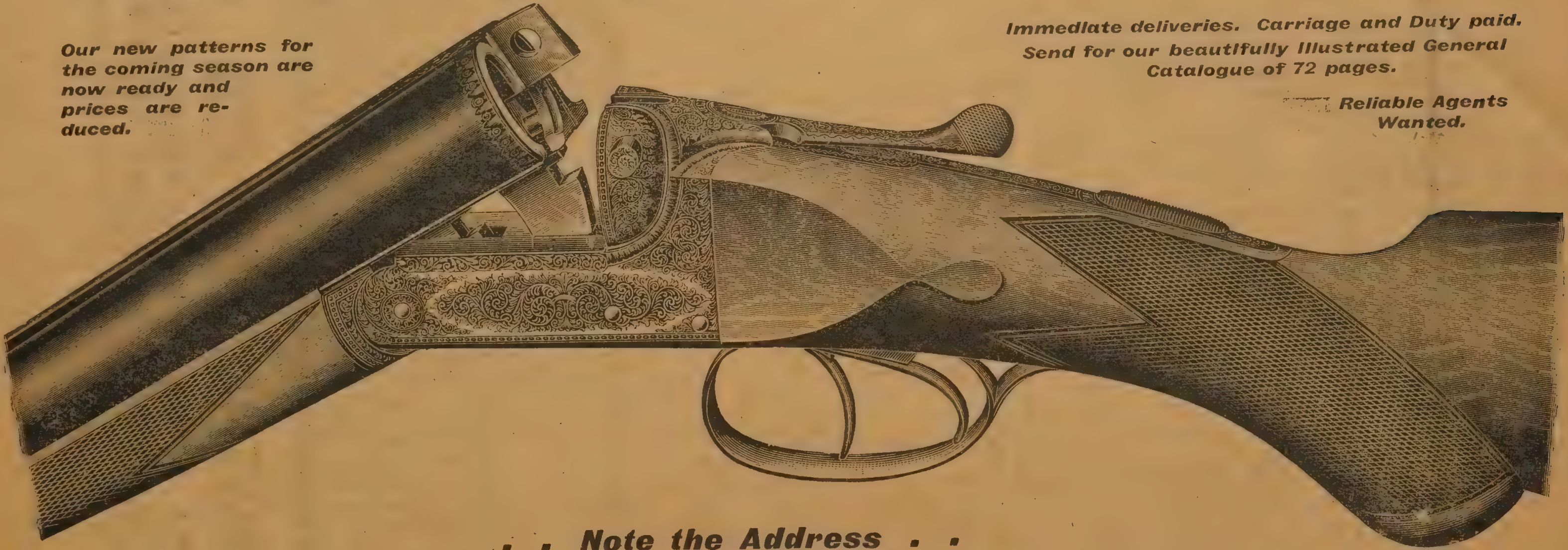

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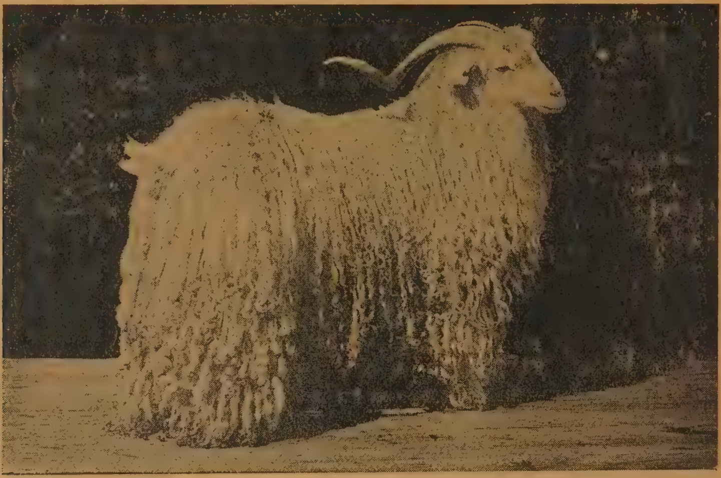

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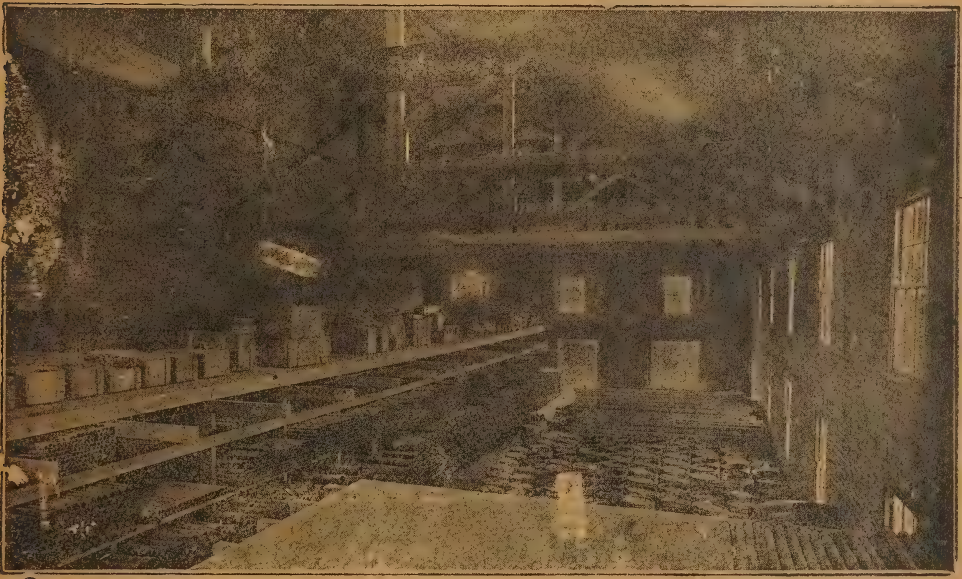

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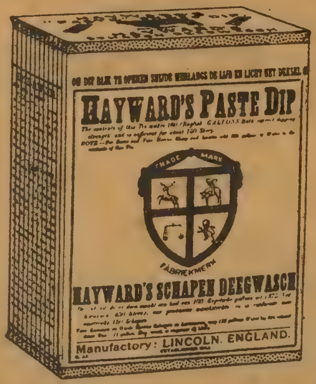
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AND PACKED 3 TWIN TABLETS IN CARTON.

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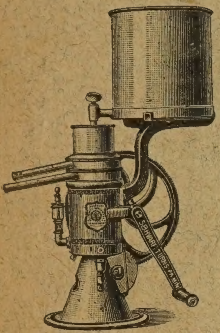
The Celebrated "Crown"



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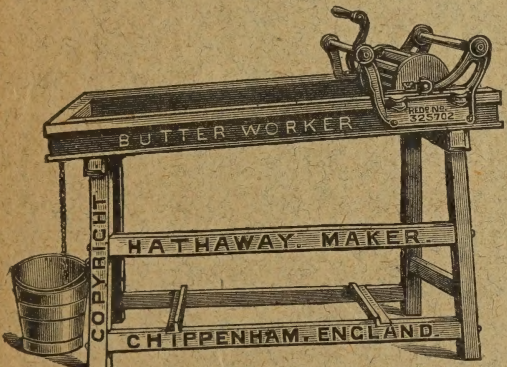

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